Salton Sea Authority

BOARD of DIRECTORS' MEETING

Thursday, February 22, 2007
10:00 A.M.

AGENDA
Torres Martinez Reservation
66-725 Martinez Road
Thermal, CA
(760) 564-4888

CALL TO ORDER, Pledge of Allegiance

PUBLIC COMMENT: *Any member of the public may address and ask questions of the Board relating to any matter within the Authority's jurisdiction. This time is reserved for matters not already on the Agenda. Remarks shall be limited to a maximum of three minutes unless additional time is authorized by the Board.*

CONSENT CALENDAR – Approve, Receive and File

A. Minutes: January 25, 2007 (Attachment 1, Pages 1-3)
B. Warrant Register Ratification 01/01/07 to 01/31/07 issued by the SSA (Attachment 2, Page 4)

EXECUTIVE DIRECTOR'S REPORT

A. Economic Benefits Report (Attachment 3, Pages 5-46)
B. Local Financial Capabilities (Attachment 4, Pages 47-66)
C. Salton Sea Coalition Concerns
D. Indian Gaming Fund Grant Applications (Attachment 5, Pages 67-76)

TECHNICAL ADVISORY COMMITTEE REPORT

OLD BUSINESS

1. Community Outreach Program Status
   A. List of Resolutions Since 1/18/2007
      1. Thermal Community Council (Attachment 6, Pages 77-78)
      2. Desert Alliance for Community Empowerment (Attachment 7, Page 79)
      3. Rancho Housing Alliance Inc. (Attachment 8, Page 80)
      4. Palm Springs Desert Resorts Convention and Visitors Authority (Attachment 9, Pages 81-82)
      5. City of Rancho Mirage (Attachment 10, Pages 83-86)
      6. All Valley Legislative Coalition (Attachment 11, Pages 87-90)
   B. Salton Sea Authority – All Resolutions of Support Received (Attachment 12, Pages 91-92)
2. Discussion of Dam Location/Water Inflows

NEW BUSINESS

1. Projects to Pursue Funding from the Water Resources Development Bill of 2005 (Attachment 13, Pages 93-108)
2. Controlled Eutrophication Project (Attachment 14, Pages 109-111)
3. Restoration Planning Five Year Plan (Attachment 15, Pages 112-132)
4. Bureau of Reclamation Preferred Alternative Report (Attachment 16, Pages 133-153)

Salton Sea Authority

5. Legislative and Congressional Strategy (Attachment 17, Pages 154-155)

6. Member Information / Discussion / Correspondence / Upcoming Meetings & Events
   A. Board Meeting for March 22, 2007

7. Next Scheduled Board Meeting: March 22, 2007, 10:00 a.m. to be held at the Coachella Valley Water District, Avenue 52 and Highway 111, Coachella, California.

ADJOURNMENT

For those wishing to tour the Wetlands, please arrive at the Torres Martinez reservation at 7:30 a.m.

OFFICIAL PROCEEDINGS

SALTON SEA AUTHORITY
BOARD OF DIRECTORS MEETING
January 25, 2007

CALL TO ORDER

A regularly scheduled meeting of the Salton Sea Authority (Authority) Board of Directors (Board) was called to order by Peter Nelson, Vice-President, at 10:10 a.m., January 25, 2007, at Imperial Irrigation District in El Centro, CA.

Vice-President Nelson introduced Director Jim Hanks, Imperial Irrigation District, as the new Salton Sea Authority Board of Directors member that is filling the Director's seat vacated by former Director Andy Horne.

BOARD OF DIRECTORS' PRESENT	AGENCY
Marion Ashley	Riverside County
James Hanks	Imperial Irrigation District
Al Loya, Secretary	Torres Martinez Tribe
Joe Loya	Torres Martinez Tribe
Stella Mendoza	Imperial Irrigation District
Peter Nelson, Vice President	Coachella Valley Water District
Roy Wilson	Riverside County

BOARD OF DIRECTORS' ABSENT	AGENCY
Larry Grogan	Imperial County
Corky Larson	Coachella Valley Water District
Gary Wyatt, President	Imperial County

PUBLIC COMMENT

Patricia Cooper, on behalf of Senator Denise Ducheny, presented a Recognition of Service Award to Andy Horne for his service to the Board. Ms. Cooper also presented a Resolution of Support on behalf of Senator Ducheny to Rick Daniels for his Distinguished Citizen Award from the Boy Scouts of America.

CONSENT CALENDAR

A. Approval of Minutes – December 21, 2006
B. Warrant Register Ratification 12/01/06 to 12/31/06
C. Approval of Record of Quarterly Contract Budget Changes
D. Approval of Record of Quarterly Contract Status Report

E. Approval of Personnel Item

A motion was made by Stella Mendoza and seconded by Al Loya to approve the Consent Calendar. There were no objections. The motion carried.

OLD BUSINESS

1 EIR COMMENTS

The Authority submitted comments to the California Department of Water Resources on January 17, 2007. The comments are posted on the Authority's website.

Vice-President Peter Nelson initiated a dialogue on inflows to the Sea, referencing Attachment 6, page 18, and the change of location of the dam structure in the Authority's Plan. Inflows to the Sea are a core issue for the Authority and the Department of Water Resources (DWR). Based on the QSA, DWR's estimated annual inflow projections to the Sea are lower than the Authority's estimates. The State's Draft PEIR analyzed the alternatives based on projected inflows of 717,000 acre-feet per year due to reduced water inflow from Mexicali and irrigation runoff and global warming. The Authority believes that the Sea will receive 800,000 plus Acre-feet-per year of inflows. Because of the difference in the State's projected inflows and the Authority's projected inflows, DWR concluded that the Authority's plan would fail to function and should be discarded from further consideration. Based on DWR's assumptions on inflows, the original placement of the dam would not be feasible. Therefore, in order to satisfy DWR's concerns, the Authority staff and consultants developed an alternative dam location 1.5 miles north of the original placement that will function under the lower inflow estimates. The dam location will be finalized during the Project Specific EIR.

Supervisor Wilson questioned information in Attachment 6, page 21, in the Executive Summary of the Authority's Comments on the Draft PEIR regarding the number of homes that would be built around the Sea. The summary states that "…the SSA Restoration Plan would result in the construction of 200,000 homes." Rick Daniels answered that he remembers the estimated number of homes around 80,000. He will find the number and make the correction.

A motion was made by Roy Wilson and seconded by Stella Mendoza to receive and file the Executive Summary with the correction to the number of homes that will be built around the Sea. There were no objections. The motion carried.

2. COMMUNITY OUTREACH PROGRAM STATUS

A. LIST OF RESOLUTIONS

Rick Daniels updated the Board on the resolutions supporting the Salton Sea Authority conceptual plan for a multi-purpose project that has been approved by local agencies since the last Board meeting. The Authority continues to seek additional resolutions of support, and support cards are still being collected. Rick has made approximately 92 presentations to a variety of community groups and cities. He continues to schedule presentations, including meetings with the various Tribes in the Valley. Joe Loya, Torres Martinez, requested a graphic that illustrates how many people are represented by the resolutions of support received.

The comment period on the DEIR has closed. The challenge for the Authority is to convince the State that the changes made to the Authority's March 2006 plan are feasible and that funding can be secured. The next step is to craft the specifics of the Authority's alternative. It is now time to build an accepted preferred

alternative and build consensus among the Salton Sea Coalition, the Imperial Group and the Authority. Rick Daniels is continuing to meet and talk with the above-mentioned groups trying to reach consensus.

Rick has traveled to Washington, D.C. where he met with Senator Boxer and her staff. Senator Boxer has sent staff to Riverside and Imperial Counties to meet with the various players in the Salton Sea restoration process. Rick has also met with Congresswoman Bono, who continues to offer her support to the Authority's plan, including the introduction of legislation to request significant funding for the plan. Congressman Bob Filner is also showing support for the Authority. Rick is also traveling to Sacramento to meet with legislators and officials to garner support for the Authority's plan.

Water Resources Development Act (WRDA) funds have been approved but not appropriated. WRDA funds will be used for five projects: Early Start Habitat, Environmental Compliance Documentation, a Controlled Eutrophication Project, an Environmental Monitoring Program and Preliminary Design Work. Each project will be allocated $5 million with a required 35% match. The Authority will work with the Army Corp of Engineers to develop language to be included in the appropriation legislation that will be submitted to Congress.

Rick is actively seeking agency funding from the Indian Gaming Fund. He has sent letters to the local tribes requesting support from each tribe for grants totaling $400,000 from the Indian Gaming Fund. Rick is working with Al and Joe Loya to schedule meetings with each tribal council.

Rick, Supervisor Wilson and Supervisor Wyatt will be meeting with Secretary Chrisman in March.

Supervisor Ashley began a discussion about consensus building with the environmental groups. Rick reported that the third party review of the seven questions that were submitted to the Authority from the Salton Sea Coalition was complete. Arcadis concluded that the Authority's project was constructible. The report has been given to the Coalition, and they have been asked for their support.

NEW BUSINESS

5. MEMBER INFORMATION/DISCUSSION/CORRESPONDENCE/UPCOMING MEETINGS & EVENTS

The City of Brawley's next scheduled council meeting will be held on February 20, 2007. Rick will be in attendance to make a presentation and ask for a resolution of support.

A Technical Advisory Committee will be set in the next two weeks.

6. NEXT SCHEDULED MEETING

The next scheduled Board of Directors meeting will be Thursday, March 22, 2007, 10:00 a.m. at the Coachella Valley Water District, Coachella, Ca.

ADJOURNMENT

There being no further business Peter Nelson adjourned the meeting at 11:15 a.m.

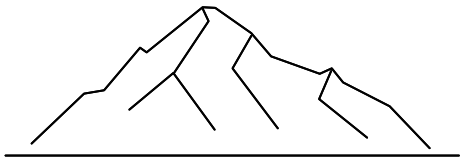
Warrant Register
January 1, 2007 to January 31, 2007

Salton Sea Authority

Warrant Date	Warrant Number	Vendor Name		Amount
01/03/07	13729	ADT	$	112.44
01/03/07	13730	Cingular Wireless		83.67
01/03/07	13731	Federal Express		172.13
01/03/07	13732	Laura Green Reimbursement		325.19
01/03/07	13733	K2 Economics		3,480.00
01/03/07	13734	Kent SeaTech		10,007.97
01/03/07	13735	Office Depot		122.34
01/03/07	13736	O'Reilly Public Relations		24,167.16
01/03/07	13737	Priority Mailing System		801.06
01/03/07	13738	Reliance Communications		4,500.00
01/03/07	13739	Salton Sea Bird Festival		50.00
01/03/07	13740	Sierra Springs		41.00
01/03/07	13741	Southwest Networks		156.25
01/03/07	13742	Tetra Tech Division		561,066.00
01/03/07	13743	Verizon		1,489.96
01/04/07	13744	Harsch Realty		3,150.99
01/23/07	13745	Cingular Wireless		112.16
01/23/07	13746	Best Best & Krieger		4,434.88
01/23/07	13747	Richard Daniels Reimbursement		2,226.41
01/23/07	13748	Federal Express		203.73
01/23/07	13749	Hasler Financial		157.30
01/23/07	13750	Innovative Document		398.61
01/23/07	13751	K2 Economics		15,580.00
01/23/07	13752	Office Depot		588.36
01/23/07	13753	Priority Mailing System		36.94
01/23/07	13754	Qwest Communications		32.38
01/23/07	13755	Sierra Springs		29.50
01/23/07	13756	Southwest Networks		406.25
01/23/07	13757	SWRCB Fees		403.00
01/23/07	13758	Time Warner Cable		124.95
01/23/07	13759	Verizon		656.96
01/23/07	13760	Water Education Foundation		288.00
01/23/07	13761	West Shores Chamber		225.00
				635,630.59

Warrant Register
January 1, 2007 to January 31, 2007

Warrant Date	Warrant Number	Vendor Name	Amount



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A Preliminary Investigation of the Potential Non-Market Benefits Provided by the Salton Sea

Final Report

prepared for

Mr. Rick Daniels
Director, Salton Sea Authority

January 10, 2007

Executive Summary

Environmental and natural resources are assets that provide returns to society now and in the future. Therefore decisions regarding the restoration or preservation of such resources should consider not only the costs of preservation but the benefits, as well. Consideration of the benefits of preservation is exceedingly important when the resource in question is unique and when decisions pertaining to the provision of such services can have irreversible consequences. The Salton Sea is one such resource that provides a set of unique natural resource services, including critical habitat to over 400 species of migratory and resident birds, approximately fifty of which have garnered special status as threatened, endangered, or species of concern. As emphasized in Shuford et al. (2002; p. 255), the Sea is a "vital migratory stopover and wintering habitat for species that breed elsewhere in Western North America," and the health of many of the populations that reside, roost, feed, or nest are dependent on the health of the Salton Sea. As succinctly put by Cohen and Hyun (2006), "The Salton Sea provides critically important habitat to a diversity and abundance of birds." Furthermore, the California State Resources Agency (2006; Chapter 1) citing Cooper (2004) suggests that the Salton Sea has "become an internationally significant stopover site for hundreds of thousands of transients moving north and south along the 'Pacific Flyway', and east into the Great Basin/Prairie Pothole region as well as the winter home for hundreds of thousands of individuals of numerous species from around North America."

With rising salinity levels and increasing pollutant loads, the ability of the Sea to continue to serve as a vibrant ecosystem providing habitat for the avian populations currently using it and the fish species that have traditionally relied on it is unlikely. Furthermore, under the Quantification Settlement Agreement (QSA) signed in 2003 that transfers water from agricultural users to urban users, the outlook is even bleaker because salinity levels will increase more rapidly than currently observed and the loss of inflow volume will lead to less shoreline and quality habitat. The outcome of this trend in habitat degradation and loss could be significant, both for the Salton Sea in its ability to serve its historic function as a habitat for both birds and fish, and for the existence and health of particular bird and fish populations themselves.

While discussions associated with restoring and preserving the Salton Sea have traditionally focused on the costs of various options, very little formal discussion has addressed the potential returns of such an investment. Consideration of the benefits of preservation or restoration has precedence at both federal and state levels. At the federal level, agencies have been mandated under executive orders (e.g., EO 12866 under President Clinton) to choose those alternatives that maximize net benefits (i.e., the difference between total benefits and total costs). At the state level, the State of California, under the California Environmental Quality Act (CEQA), may take into account the economic and social effects associated with any project to assist in determining the significance of the physical changes associated with a particular project (CEQA Guidelines, section 15131(b)). And it should be emphasized that even when much of the preservation benefits consists of non-market value, many state and federal agencies have not only acknowledged such benefits, but also quantified them for guidance in their resource allocation decisions. Examples of such agencies include: the U.S. Department of Interior under the Comprehensive Environmental Response, Compensation, and Liability Act (1980), the National Oceanic and Atmospheric Administration under the Oil Pollution Act (1990), the U.S. Army

Corps of Engineers, the U.S. Bureau of Reclamation, the U.S. Water Resources Council, and state fish and game agencies in Oregon, Nevada, California, Idaho, and Maine. Examples of applications include: Glen Canyon Dam, Hell's Canyon, Mono Lake in California, the spotted owl in the Pacific Northwest, and Kootenai Falls in Montana.

The purpose of this report is to provide some preliminary estimates that are suggestive of the potential value associated with preserving the Salton Sea. Indeed, as an advisory arm of the federal government, the National Resource Council (2004; Executive Summary) argued recently that "assigning a dollar figure" to non-market ecosystem services "…are a must to accurately weight the trade-offs among environmental policy options." Failure to include a measure of the value of ecosystem services in benefit-cost calculations will implicitly assign them a value of zero, which we know is incorrect as evidenced by the body of literature that has estimated the monetary value of similar services.[1] This literature is quite extensive and includes values derived for all manner of ecosystems, including tropical rainforests, wetlands, deserts, and a variety of marine environments.

Although time constraints do not permit a primary valuation study or a formal statistical analysis of previous research at this time, this report does provide an estimated range of annual benefits from the Sea using the "value transfer" method. This method involves deriving updated estimates of habitat or species preservation values from previous research that has performed a primary valuation study or meta-analysis, and then transferring these values to the Salton Sea. To derive these updated estimates, we undertook a thorough search of the environmental and natural resource economics literature on ecosystem service valuation, focusing on the services provided by the Sea that tend to benefit geographically dispersed populations rather than just the local population. Our search included the EconLit database, the Environmental Valuation Reference Inventory (EVRI; the largest database on valuation studies), Google Scholar, and our own private collections of literature on natural resource valuation. Our initial searching and screening of these sources and topics produced around 70 studies. Subsequent screenings narrowed the list to 23 studies of which 20 included at least one value with potential relevance for the Salton Sea.

Of these 23 studies, we determined that those addressing wetlands and wildlife in the San Joaquin Valley (SJV) and those addressing the Mono Lake ecosystem are most relevant and provide the most useful benefits estimates for the Salton Sea. Keeping in mind the uniqueness of the Salton Sea—which we believe tends to increase its value while also making it difficult to transfer benefits estimates from previous research—and the caveats we provide throughout this report, we believe that a conservative order-of-magnitude estimate of the non-market benefits provided to the residents of California by a restored and preserved Salton Sea would be in the range of $1-$5 billion annually. This estimated range includes both use and non-use value, but probably mostly non-use value.

Some additional considerations are worth mentioning when interpreting this estimated range of preservation benefits. First, assuming the transferability of the SJV and Mono Lake estimates is high (something we cannot determine with certainty without conducting a primary valuation

[1] Wilson and Carpenter (1999), for example, provide a summary of the economic value of freshwater ecosystem services in the U.S., noting 30 refereed published articles in the scientific literature from 1971 to 1997.

study of the Salton Sea), we are inclined to believe that these value transfers probably underestimate the total non-market value of the Sea. We believe the SJV estimates are low primarily because they value only wetland habitat. The other attributes of the Sea clearly have positive values that are not included in this estimate. We believe the Mono Lake estimate is low primarily because the Sea is significantly larger than Mono Lake and, in our judgment, it is a more important component of the Pacific Flyway. Furthermore, we believe the higher Mono Lake estimates by Loomis (1987, 1989) may be provide better comparison values for the Sea because they are based on a relatively worse no-action scenario. Compared to the no-action scenario considered in the Mono Lake EIR (JSA 1993), we think the no-action scenario considered by Loomis is more similar to that for the Salton Sea.

Finally, we emphasize that these estimates are suggestive. The characteristics of the resources on which our estimates are based, as well as peoples perceptions/values of those characteristics, likely differ from the services provided by the Salton Sea and how these services are perceived/valued. This is what Freeman refers to as differences in "supply side" and "demand side" factors (Freeman 2003; p. 454). Yet based on the results of Loomis (2000) who evaluated six different resource preservation programs, residents within the states where these sorts of unique and threatened resources are located only hold a fraction (approximately 13%) of their national value. Furthermore, as estimated in Loomis and White (1996) through their meta-analysis of valuation studies for rare, threatened, and endangered species, the authors find that even for the most costly endangered species preservation efforts, the benefits are likely to exceed the costs. Hence, while our estimates are suggestive, there are many reasons to believe that these estimates are good first round approximations, and most likely conservative approximations at that, of the value with preserving the Salton Sea.

Table of Contents

I. Introduction

Environmental and natural resources are assets that provide returns to society now and in the future. As such, decisions as to the restoration or preservation of such resources should consider not only the costs of such preservation, but the returns associated with preservation. Consideration of the benefits of preservation is exceedingly important when the resource in question is unique, and when such decisions can have irreversible consequences pertaining to the provision of such services. The Salton Sea provides a set of unique environmental and natural resource services, such as critical habitat for both the endangered desert pupfish and over 400 species of migratory and resident birds, approximately fifty of which have garnered special status as threatened, endangered, or species of concern. While discussions associated with restoring and preserving the Salton Sea have traditionally centered around the costs of various options, very little discussion, at least formally, has involved the potential returns of such an investment. California State Senator Denise Ducheny inferred as much when she emphasized that the merits of any particular restoration strategy should not be based on initial cost estimates alone.[2]

To date, there has been no formal quantification of the existence and preservation benefits associated with the Salton Sea. Indeed, as an advisory arm of the federal government, the National Resource Council (2004; Executive Summary) argued recently that "assigning a dollar figure" to non-market ecosystem services "…are a must to accurately weight the trade-offs among environmental policy options." Failure to include some measure of the value of ecosystem services in benefit-cost calculations will implicitly assign them a value of zero, which we know is incorrect and unnecessary since plenty of analyses exist that have estimated the monetary value of similar services.[3] This literature is quite extensive and includes values derived for all manner of ecosystems, including tropical rainforests, wetlands, deserts, and a variety of marine environments. In light of this information and methods, the National Resource Council (2004) made the following recommendations:

- Policymakers should use economic valuation as a means of evaluating the trade-offs involved in environmental policy choices; that is, an assessment of benefits and costs should be part of the information set available to policymakers in choosing among alternatives.
- If the benefits and costs of a policy are evaluated, the benefits and costs associated with changes in ecosystem services should be included along with other impacts to ensure that ecosystem effects are adequately considered in policy evaluation.
- Economic valuation of changes in ecosystem services should be based on the comprehensive definition embodied in the total economic value (TEV) framework; hence, both *use* and *non-use* values should be included (Arrow et al. 1993).[4]

[2] Remarks by State Senator Ducheny at "The Salton Sea Centennial Symposium", San Diego, Ca., April 1, 2005

[3] Wilson and Carpenter (1999), for example, provide a summary of the economic value of freshwater ecosystem services in the U.S., noting 30 refereed published articles in the scientific literature from 1971 to 1997.

[4] *Use* values are those values society places on the tangible uses of goods and services whereas *non-use* values are those values society places on intangible uses. Complete definitions and examples are given in section II.

With these recommendations in mind, the intention of this report is to provide some preliminary estimates that are suggestive of the value associated with preserving the Salton Sea. Our approach involves developing updated estimates of habitat or species preservation values from research that has performed a primary valuation study or meta-analysis. This simple benefits transfer approach is outlined in Freeman (2003) and Rosenberger and Loomis (2003). To develop these estimates, which we assume can be suggestive of potential value associated with characteristics of the eight Salton Sea Restoration alternatives versus the no-action alternatives as outlined under the Salton Sea Ecosystem Restoration Draft PEIR, we undertook a thorough search of the environmental and natural resource economics literature on ecosystem service valuation, focusing on the types of services that tend to benefit geographically dispersed populations, rather than just the local population residing in the immediate vicinity of the resource. From this survey, we identify the aggregate and disaggregate (e.g., per acre of habitat preserved or per household) preservation value estimates that may serve as starting points for valuing preservation of the Salton Sea.[5]

Because time constraints restrict us from performing a primary valuation study or a meta-regression, either of which would provide a more accurate and reliable estimate, we therefore employ a more straightforward value transfer method (Rosenberg and Loomis, 2003) using existing research that provides estimates from other studies to be used as a benchmark for possible preservation values for the Salton Sea and can serve two important roles. First, these estimates can provide policy makers with an idea of the preservation benefits from other studies of similar, albeit not identical, habitat. Second, this exercise highlights the importance of and value in performing a more concrete and extensive study so as to better pinpoint the preservation estimates associated with a particular restoration alternative. Of course, all the caveats of using this simple benefits transfer method, as pointed out in Freeman (2003) and Rosenberger and Loomis (2003), apply.

The report is organized as follows. Section II provides a brief discussion of the Salton Sea, with particular attention to the services that may be lost in lieu of any restoration plan as well as the legal and regulatory underpinnings that seem to motivate some sort of restoration. Elements of eight restoration alternatives as outlined in the Salton Sea Ecosystem Restoration Draft PEIR (Draft PEIR; California State Resources Agency 2006) are discussed briefly. In section III, a brief discussion of environmental and natural resource non-market valuation is provided, with particular attention given to non-use values, in the context of benefit-cost analysis. Section III also includes a brief discussion of legal and regulatory framework supporting non-market valuation. Case studies that have estimated the preservation values of ecosystem goods and services are presented in section IV, along with a short description of our research methodology. Finally, section V provides the conclusions.

[5] While the authors are aware of two studies that have attempted to estimate the economic value of preserving the Salton Sea—CIC Research (1989) and the Inland Empire Economic Database and Forecasting Center (IEEC 1998)—neither of these studies estimated non-market values; rather their main focus was on expenditures, changes in property values, and tax revenues generated from those property value changes.

II. The Salton Sea: Services, Legislation, and Elements of the Restoration Plans

The Salton Sea, a terminal lake located in Southern California 35 miles north of the U.S.-Mexico Border, has a total surface area of nearly 370 square miles making it the largest body of water in California as measured by surface area (Cohen and Hyun 2006). While lakes have existed in the present site in the past, the current configuration was formed in 1905 due to an unanticipated dam breach. The elevation of the Sea is relatively stable currently, at around 238 feet below mean sea level. This elevation is maintained by agricultural drainage inflows primarily from the Imperial and Coachella Valleys. The salinity and nutrient-laden constituency of the inflow, coupled with the fact that the Salton Sea is a terminal lake, leads to increasing levels of salinity and nutrient loadings with each year. Currently, Salton Sea salinity levels are around 46,500 mg/L, approximately 1/3rd saltier than the ocean; the nutrient-rich inflows from agricultural drainage have resulted in the Sea being a very productive ecosystem with high biological activity yet with very low levels of dissolved oxygen concentrations.

II.1 Biological Services

Over the past 100 years, the Salton Sea has become a very unique and productive ecosystem. Currently, the Sea provides habitat to over 400 species of birds and a variety of other wildlife species. In recent years, over one-half a million water birds have been observed in and around the Sea, and nearly 3.5 million eared grebes (Jehl and McKernan 2002). This valuable avian habitat has supported more than 50 species that are officially considered threatened, endangered, or *species of concern*. As outlined in Cohen and Hyun (2006) and elsewhere[6], the Sea provides habitat to the federally endangered brown pelican, nearly 40% of the entire U.S. population of federally endangered Yuma clapper rails, more than 90% of the North American population of eared grebes, approximately 30% of the entire North American population of white pelicans, and nearly 50% of the world's population of mountain plovers (Shuford et al. 2002). As highlighted in Shuford et al. (2002), the Salton Sea provides habitat to 19 species of water birds that are considered species of high conservation concern. As an aquatic habitat, the Sea supports a number of fish species, including the federally endangered desert pupfish. Large populations of Tilapia, Orangemouth Corvina, Sargo, and Gulf Croaker have been present.

As a system, the Sea provides a very unique and important habitat. As emphasized in Shuford et al. (2002; p. 255), it is a "vital migratory stopover and wintering habitat for species that breed elsewhere in Western North America," and the health of many of the populations that reside, roost, feed, or nest are dependent on the health of the Salton Sea. As succinctly put by Cohen and Hyun (2006), "The Salton Sea provides critically important habitat to a diversity and abundance of birds." Furthermore, the California State Resources Agency (2006; Chapter 1) citing Cooper (2004) suggests that the Salton Sea has "become an internationally significant stopover site for hundreds of thousands of transients moving north and south along the 'Pacific Flyway', and east into the Great Basin/Prairie Pothole region as well as the winter home for hundreds of thousands of individuals of numerous species from around North America."

[6] For instance, see the Salton Sea Authority webpage (www.SaltonSea.org).

Yet, with increases in salinity and nutrients, and the loss and degradation of substitute habitat elsewhere (Dahl et al. 1997), the future portends grave concern for many of these species. Indeed, declining water quality from increased salinity and pollutant loadings has all but eliminated the marine fish species. Barring major human intervention, the ability of the Sea to continue to serve as a vibrant ecosystem providing habitat for the avian populations currently using it and the fish species that have relied on it is unlikely. Furthermore, under the Quantification Settlement Agreement (QSA) signed in 2003 that transfers water from agricultural users to urban users, the outlook is even bleaker. The transfer water will come from agricultural users in the Imperial Irrigation District mostly through fallowing and water conservation schemes, thereby resulting in less drainage water flowing into the Salton Sea; consequently, salinity levels will increase even more rapidly than currently observed.

While the exact outcome associated with the no-action alternative is unknown, researchers at the Pacific Institute has made some predictions. On the physical and chemical aspects of the Sea, Cohen and Hyun (2006; page i) suggest:

> The amount of water flowing into the Sea in the next twenty years will decrease by more than 40%, causing its surface elevation to drop by more than 20 feet, rapidly shrinking its volume by more than 60%, tripling its salinity….

Consequently, the biological outcome from these changes include (ibid 2006; p. i):

> Many—if not most—of the hundreds of thousands of birds that currently use the Sea will lose their roosting and breeding habitats and their sources of food. The Sea's fish will be almost entirely gone within a dozen years. Those birds that remain will suffer from disease and the reproductive deformities and failures that plagued the Kesterson National Wildlife Refuge twenty years ago. Some of the endangered and threatened species that use the Sea may be able to find other habitats, but others could suffer significant population losses.

Finally, the report concludes that (ibid 2006; p. iii):

> The future loss of food sources and the loss of habitat as the Sea recedes will eliminate the ecological value of the Salton Sea for most of the birds that currently use it. The loss of this critically important breeding habitat and refueling stopover for migrating birds will be felt throughout western North America.

II.2 Anthropocentric Services

From an anthropocentric perspective, the losses in habitat, fish, and avian species and diversity have implications. This diverse habitat has provided many benefits to society, particularly on the recreational front. Millions of people have visited the Salton Sea for such activities as camping, fishing, birding, photography, boating, and other water-related activities. Given the diversity and magnitude of the bird populations, visitors worldwide visit the Salton Sea to see the birds (personal communication, T. Miller, Southwest Birders, December 2006), often during the

Salton Sea International Bird Festival, which has held an annual event since 1997. Alternatively, the Sea has been considered one of the most productive fisheries in the world (Cohn 2000), especially during the years from 1960 to 2000. For instance, in 1969, the Salton Sea experienced nearly 1.5 million visitors, 2/3rd of which were for sport fishing (Harris et al. 1969). In 1987, there were nearly 2.6 million visits by recreators to the Salton Sea, making it a more visited site than Yosemite National Park (CIC Research 1989).

Recreational opportunities due to the services provided by the Salton Sea occur at a number of locals in the Imperial, Coachella, and Riverside counties (see the Draft PEIR, Chapter 13, for a more complete description of these establishments and the services they provide). Recreational opportunities such as swimming, water skiing, sport fishing, and boating have been available around the Salton Sea shoreline. At the Sonny Bono Salton Sea National Wildlife Refuge, which was established in 1930 as the Salton Sea National Wildlife Refuge, critical habitat exists for the Pacific Flyway; furthermore, this area is considered one of the premier bird watching locations in the nation, if not the world (California State Resources Agency 2006, p. 13-4). Opportunities such as wildlife observation, photography, picnicking, and nature trails also exist at the Sonny Bono Refuge, which has averaged nearly 32,000 visitors annually since 1990.

Another popular destination for recreation that is reliant on the restoration of the Salton Sea is the Salton Sea State Recreational Area (SRA). Located along 15 miles of Salton Sea shoreline, the SRA has provided camping, boating, swimming, waterskiing, and angling opportunities. Season-high recreational visits occurred in the 1960s, with nearly 660,000 visitors. Since the mid-1990s, though, visitation rates have ranged from around 100,000 to nearly 282,000 annually.

Additional locations for recreation and for the preservation of these valuable and unique resources, especially in the aggregate as a biologically rich and diverse ecosystem, exist in and around the Salton Sea (e.g., the Wister and Hazard Wildlife Areas in the Imperial County). All of these activities will be threatened with the continual degradation of the Salton Sea. In the Draft PEIR it is noted that under a no-action policy, hunting and birdwatching opportunities would be reduced compared to existing conditions. As mentioned earlier, fish populations would decline even further than recently observed. As of 2000, there was a substantial decline in all sport fish, and marine fish have not been detected in the Department of Fish and Game gill net samples since mid-May 2003. Tilapia still exist, but their populations are down to 10% of those levels observed in the early 1990s. Fishing and recreational boating activities have practically vanished. In the 1980s, there were eight boat launching facilities around the Salton Sea, whereas today only one remains. Without the diversity and abundance of avian and marine species, and with the ever-decreasing water quality conditions, recreational visits for hunting, photography, boating, camping, picnicking, and birdwatching will decrease.

Another loss associated with the degradation of the Sea, and perhaps the largest loss, does not necessarily come from the loss to current users of the Sea, but rather from people that care about the Sea regardless of whether they tangibly use the Sea currently. People have been observed benefiting from environmental resources, and willing to pay to protect them, just by knowing the resources exists. For example, Sanders et al. (1990) estimates what people are willing to pay (i.e., their value) for preserving free flowing rivers with no intention of ever visiting them. Alternatively, Olsen et al. (1991) estimate peoples willingness to pay (value or benefits) for

maintaining salmon migrations, again, without actively engaging in any recreation activities (e.g., fishing, photography) involving these salmon. As will be expounded on in the next section, this sort of value is called a non-use or passive-use value and captures that value people have for resources for possible future use by themselves, future use by future generations, current use by others, or simply because they think it is the right or moral thing to do.

II.3 Legislation and Additional Responses by Governmental Agencies

Governmental response to these potential threats has occurred as early as 1992, when Congress enacted the Reclamation Projects Authorization and Adjustment Act (Public Law 102-575), which officially recognized that Salton Sea restoration was in the *interest of the nation*. In particular, it required the Secretary of Interior to conduct research to identify a means to reduce and control salinity, provide endangered species habitat, enhance fisheries, and protect human recreational values in the area of the Salton Sea. At the more local level, the Salton Sea Authority (SSA) was formed in 1993 as a joint powers authority by the approval of Imperial and Riverside Counties, along with the Imperial Irrigation District (IID) and Coachella Valley Water District (CVWD). The SSA was charged with managing and operating the Salton Sea so as to improve recreational activities/opportunities, and improve water quality. In 1998, Congress passed the Salton Sea Reclamation Act of 1998, which charged the Secretary of the Interior to perform feasibility studies and cost analyses of options for restoring the Salton Sea. The goal of these investigations included finding solutions to restore recreational uses, maintain a productive fishery, and provide a safe, productive environment for birds and endangered species (Glenn et al. 1999). A final federal act, the Water Supply, Reliability, and Environmental Improvement Act of 2004 (Public Law 108-361), required the Secretary of the Interior to complete a feasibility study on a preferred alternative for the restoration of the Salton Sea in coordination with the State of California and the SSA.

At the state level, a number of bills were enacted, and collectively referred to as the QSA legislation. One outcome of these bills was the Salton Sea Restoration Act (California State Fish and Game Code Section 2930), which charges the State of California to undertake the restoration of the Salton Sea ecosystem and provide permanent protection of the wildlife dependent on that ecosystem. The Salton Sea Restoration Act required that California identify a preferred alternative from a list of possible restoration alternatives. The preferred alternative was to provide for the maximum feasible attainment of the following objectives related to avian and marine species:

- Restoration of long term stable aquatic and shoreline habitat for the historic levels and diversity of fish and wildlife that depend on the Sea;
- Protection of water quality.

II.4 Elements of Salton Sea Restoration Draft PEIR

As outlined in the Draft PEIR (Chapters 2 and 3), eight alternative restoration plans are presented and evaluated versus two no-action alternatives. Associated with each of the restoration alternatives is the provision of a Saline Habitat Complex and/or Partial Sea that is intended to provide similar or improved habitat relative to what currently exists for the marine and avian

species that have historically been present at the Salton Sea. These alternative habitat configurations would provide food, nesting, and roosting habitat, as well as adequate stopover and wintering habitat for those birds migrating along the Pacific Flyway.

Specifically, the Saline Habitat Complex, as outlined in the Draft PEIR (pp. 2-24), is to provide "a mosaic of shallow and deep water habitats with islands and snags that would be similar to the habitat located near the confluences of the New, Alamo, and Whitewater rivers and the Salton Sea and shallow shoreline habitat. This type of habitat has been extremely productive for both fish and wildlife at the Salton Sea..." The salinity levels of the Saline Habitat Complex would range from 20,000 mg/L to 200,000 mg/L, and "could be located in areas that could provide relatively shallow water along the shorelines."

For the Partial or Marine Sea, a number of objectives have been slated to be included, such as:

- Salinity of 30,000 to 40,000 mg/L to maintain marine sea water quality;
- Water surface elevation of -230 feet mean sea level to maintain the shoreline as close as possible to existing conditions;
- Partial Sea water to be located near communities on the western and eastern shorelines, and managed wildlife and agricultural areas along the southern shoreline.

Together, the Marine Sea and the Saline Habitat Complex are to provide services that maintain or build upon the quality of such services in the past, including: fishing, boating, water skiing, bird watching, hiking, hunting, swimming, camping, and other sorts of activities (e.g., biking).

In terms of habitat that could be considered substitute habitat for current habitat, or perhaps even an improvement upon current habitat, the eight alternatives provide the following:

- Alternative 1: 38,000 acres of Saline Habitat Complex.
- Alternative 2: 75,000 acres of Saline Habitat Complex.
- Alternative 3: 61,000 acres of Marine Sea.
- Alternative 4: 88,000 acres of Concentric Lakes that would serve a similar role as the Saline Habitat Complex.
- Alternative 5: 45,500 acres of Saline Habitat Complex; 62,000 acres of Marine Sea.
- Alternative 6: 29,000 acres of Saline Habitat Complex; 74,000 acres of Marine Sea.
- Alternative 7: 12,000 acres of Saline Habitat Complex; 104,000 acres of Marine Sea
- Alternative 8: 18,000 acres of Saline Habitat Complex; 83,000 acres of Marine Sea.

The particular details of each alternative vary quite substantially, even in terms of where and how the Saline Habitat Complex and Marine Sea will be provided. Yet the common denominator across all of these alternatives is that they are to provide habitat that is intended to (i) restore the long-term stable aquatic and shoreline habitat to historic levels and diversity of fish and wildlife that depend on the Sea, and (ii) protect water quality. Hence, in our analysis

below, we do not evaluate and compare neither particular alternatives nor the specific configuration of any alternative. Rather, we compare the intent of these restoration plans—the provision of substitute habitat that at a minimum maintains the services and diversity that have been provided historically—to the outcome under a no-action alternative. We assume that the services at that have been provided at the Sea under the no-action alternative will either cease to exist, or those that still exist will be of substantially lesser quality relative to what has been historically provided (see our discussion in section II.1). Furthermore, we do not consider other elements of the restoration alternative that could be substantial, in particular, issues associated with air quality. Rather, we focus exclusively on the potential benefits of preserving ecosystem services such as those found at the Salton Sea, with particular attention to the values associated with birds, endangered and threatened species, biodiversity, and unique habitats.

Finally, we should note that all of the particular restoration alternatives require substantial construction activities over a number of years, beginning in 2012. The benefits of the services these alternatives are intended to provide may take between 18 and 66 years to come to fruition. Our analysis does not consider adjusting for differing time horizons over which these services will be provided. It should be noted, though, that during the interim period while the construction or these alternatives is occurring, a substitute habitat will be provided to mitigate the adverse impacts of the construction activities as well as any increases in salinity and habitat degradation occurring prior to construction. As noted in the Draft PEIR (2006, pp. 3-6):

> All eight alternatives would include up to 2,000 acres of shallow saline habitat for use by birds after the Salton Sea salinity becomes too high to sustain some species. This habitat would be constructed prior to construction of full-scale habitat components, and is referred to as Early Start Habitat. Early Start Habitat was assumed to be located at elevations between -228 and -232 feet msl. Early Start Habitat would be a temporary feature for two to six years and would be eliminated or assimilated as the alternatives are constructed along the southern shoreline prior to 2020.

Hence, overlooking the time dimension in terms of measuring the benefits these alternatives provide is not critical given the provision of this Early Start Habitat.

III. Non-market Valuation in Benefit-Cost Analysis

Much of the discussion surrounding the restoration of the Salton Sea has centered on the costs of the various alternatives, understandably so given these costs may exceed $4 or $5 billion over the 75 year horizon in which the restoration alternatives are evaluated. The focus on the costs also is likely due, in part, to legislation that mandates such an evaluation. The Secretary of the Resources Agency in California is mandated to establish "suggested criteria for selecting and evaluating alternatives" (Section 2081.7 of the California State Fish and Game Code, part (e)). Two explicitly mentioned criteria include an evaluation of the construction, operation, and maintenance costs of each alternative, and the identification of a cost-effective, technically feasible option. What is surprisingly absent from this discussion is the role the benefits, and in particular the quantification of the benefits, play in the choice of a preferred alternative. While there likely is no disagreement that restoration will cost substantial money, one need only pause briefly to realize that the benefits of restoration can also be substantial and as such, should be considered in concert with any discussion of the costs.

Consideration of the benefits as having equal footing with the costs of such preservation activities is not novel. Ciriacy-Wantrup (1952), Barnett and Morse (1963), and Krutilla (1967) all highlight this point in one way or another in the context of how government might go about considering the trade-offs it requires of its citizenry with respect to natural resource preservation. A major point emphasized by Krutilla, in terms of this trade-off, is to recognize that society benefits from preservation in real terms:

> When the existence of a grand scenic wonder or a unique and fragile ecosystem is involved, its preservation and continued availability are a significant part of the real income of many individuals. (Krutilla 1967; p. 779)

Furthermore, with the loss of similar habitat elsewhere, the value of these assets will likely increase:

> Natural environments will represent irreplaceable assets of appreciating value with the passage of time. (Krutilla 1967; p. 783)

The manner in which one might consider these preservation benefits is in the context of benefit-cost analysis, which we believe provides a more accurate comparison and evaluation of the merits from public spending on Salton Sea restoration than what is currently required of the Resources Agency. While the foundations of benefit-cost analysis can be traced back as far as Benjamin Franklin's discussion of prudential algebra, the formal use of benefit-cost analysis for large water-related projects can be linked to Eckstein (1958) in his evaluation of federal water-resource programs. In particular, Eckstein (1958, p. 2) references the Flood Control Act of 1936, which suggests that only projects where "the benefits, to whomsoever they may accrue, are in excess of the estimated costs" would be considered. Eckstein described benefit-cost analysis as a very promising approach for evaluating the use of scarce natural and financial capital that can provide a much stronger foundation for policy decisions than what might otherwise be available.

Such insight is certainly useful in the current discussion associated with the Salton Sea. The estimated price tag associated with the eight restoration alternatives range from $2.3 to $5.9 billion in construction costs alone. If decisions were based on just these costs, the no-action alternative would be the economically prudent strategy, costing $801 million.[7] Yet a more economically efficient approach, and one that echoes the sentiments of Eckstein, Franklin, and Krutilla, among others, is to consider the returns for the investment and choose the strategy that provides the greatest returns per dollar invested. The policy that maximizes the difference between total benefits and total costs, i.e., *net benefits*, is considered the most economically efficient solution.

Why there has not been greater focus on using benefit-cost analysis in the context of Salton Sea restoration is puzzling, especially when such an approach has been prominent for more than 30 years at federal level in consideration of major environmental, health, and safety regulations (Morgenstern 1997). Under President Reagan's Executive Order 12291, for instance, all major health, safety, and environmental regulations were subject to a regulatory impact assessment and needed subsequent approval by the Office of Management and Budget (OMB). OMB required the "potential benefits outweigh the costs" and that "of all the alternative approaches to the given regulatory objective, the proposed action will maximize net benefits to society." These requirements were amended slightly under Executive Order 12866 during the Clinton administration. EO 12866 replaced the condition "benefits outweigh costs" with "a reasoned determination that the benefits of the intended regulation justify its costs." Agencies were now allowed to "include both quantifiable measures and qualitative measures of costs and benefits" and to "select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts, and equity)." Clinton's order endorsed benefit-cost analysis as a tool to help inform the regulatory process, without forcing it to adhere to any rigid decision-making formula.

Numerous real world examples exist of governments incorporating the benefits of preserving natural and environmental resources into their decision-making, both in the U.S. and abroad. Such evaluations cover a wide array of resources, including the Glen Canyon Dam (Bishop et al. 1989), Hell's Canyon (Krutilla and Fischer 1975), Mono Lake (Loomis 1987), the spotted owl in the Pacific Northwest (Hagen et al. 1992), Kootenai Falls in Montana (Duffield 1982), and the Kakadu Conservation Reserve in Australia (Imber et al. 1991), to name a few. In these and other studies, the preservation benefits associated with the environmental and natural resources were quantified and given standing in benefit-cost analysis. In each case, the quantification of the preservation benefits either supported an action for preservation, or modified an existing development scheme to be more environmentally friendly. A large part of the value of preservation, if not the largest component economically, is that value that is not traded in markets, i.e., its non-market value.

III.1 Non-market Environmental and Natural Resource Values

For most goods and services, the starting point for estimating value is the market price. Yet for many environmental and natural resource goods and services, no such market price exists. For

[7] Construction costs for the no-action alternatives include pre-existing regulations and mandates requiring protection of the desert pupfish, air quality management, and modification of the recreational facilities at the Salton Sea.

such goods as cleaner air, biodiversity, endangered species, and wildlife habitat, rarely are there market transactions revealing the price, and subsequently the value, of these goods and services to society. Consequently, the scarcity value of these goods and services is not readily apparent to policy makers in charge of determining how these scarce and often unique resources are to be allocated. As an example of this problem, consider the decision of how to allocate an acre of land in, say, Sequoia National Forest. There is value associated with the timber that could be obtained from these giant trees. Yet, there also is value in preserving the forest in its present state for recreation activities such as hiking, camping, and photography today and in the future. There is value indirectly in the habitat these forests and trees provide for other wildlife resources we enjoy. There is also value in simply knowing that these resources exist for use by others, and possible future use by current and future generations. As such, we define the value of a resource that is not revealed through market transactions as its non-market value. Without knowledge these non-market values, benefit-cost analysis is limited in its usefulness in aiding policy markers on how to efficiently and equitably allocate these resources.

The objective of non-market valuation is to estimate the economic value of these environmental and natural resources to society. Quantification of the benefits allows these goods and services to have equal footing in benefit-cost analysis. In considering the benefits of preservation, one would want to account for total value of the resource, where total value is defined as:

$$\textit{Total Economic Value} = \textit{Use Value} + \textit{Non-use Value.}$$

Use value relates to the tangible use of the resource presently. It can include both consumptive use (e.g., *catch and keep* fishing) and non-consumptive use (e.g., photography, or *catch and release* fishing). Non-use value, as described in Kopp and Smith (1993; p. 340), is that "…component of the value of a natural resource that does not derive from the in situ consumption of the resource." Alternatively, Freeman (2003) notes that environmental values that are independent of peoples' current use have been given a variety of names, including non-use value, existence value, intrinsic value, and passive-use value. There are four general categories for non-use values, including: *option value*—the value that people place on a good or service for future possible use; *altruistic value*—the value someone places on the preservation of a resource for use by others in the current generation; *bequest value*—the value someone places on the preservation of a resource for use by future generations; and *existence value*—the value one places on a resource for its mere existence, possibly for moral or ethical reasons.

Non-market valuation techniques are widely accepted and used by federal and state agencies, including the National Marine Fisheries Service, the U.S. Water Resources Council, and state fish and game agencies in such states as Oregon, Nevada, California, Idaho, and Maine, to name a few (Loomis 1993).[8] And while the popular press has only recently begun extolling the importance of placing a value on non-market environmental goods and services,[9] these values, and the techniques used to estimate them, have been given standing in legislative mandates and by state and federal government agencies for decades, including: the Comprehensive Environmental Response, Liability, and Compensation Act (CERCLA) of 1980; the Oil

[8] For a complete description of these techniques, see Freeman (2003).

[9] For example, The Economist, 2005, April 3rd- 29th, pp. 76-78; Business Week, 2004, December 29th; Infocus Magazine, 2005; 4.3; Outside Magazine, March, 2005, pp. 106-123.

Pollution Act (OPA) of 1990; U.S. Water Resources Council; the U.S. Department of Interior (DOI); and the U.S. Forest Service. Federal and state agencies also consider non-market values when making natural resource allocation decisions. Since 1979, for example, the U.S. Army Corps of Engineers and U.S. Bureau of Reclamation have been required to assess the value of recreation benefits in cases where federal projects impact areas of high visitation (U.S. Water Resources Council 1979; Loomis 2005). The U.S. Environmental Protection Agency is required to conduct benefit-cost analyses of environmental regulations and must include estimates of non-market benefits. CERCLA mandates that lost recreation values and "passive use" values from toxic waste sites and hazardous materials spills must be assessed in order to measure the full value of damaged natural resources. Many states have funded studies measuring non-market values associated with recreation, including the State of California, which sponsored an analysis of the values of protecting Mono Lake as a bird habitat (Loomis 2005). The validity of valuing changes in natural resource quality has been upheld in state and federal courts, and these techniques have been useful in guiding resource allocation decisions at state and federal levels.

In considering the non-market values associated with preservation of the Salton Sea, a variety of stakeholders come to mind. The Sea provides many non-market benefits to the State of California. As mentioned in Section II, thousands of visitors frequent the Sea annually for birdwatching, it has been the only Talapia sports fishing area in the state, and other activities such as camping, boating, and swimming occur throughout the year. Indeed, on average nearly 200,000 visitors annually frequent the Salton Sea State Recreation Area alone. According to IEEC (1998), the total value in 1998 of all Salton Sea properties within ½ mile of the shoreline was $154.8 million, while the total population within five miles of the Salton Sea was estimated to be fewer than 15,000. Maintaining and/or enhancing recreational uses can impact a large population base, including residents from San Diego and Los Angeles, California.

The Sea also provides non-market benefits to the nation as a whole. The Salton Sea is ranked as the second highest birding area in the nation. Indeed, 90% of the North American population of eared grebes, more than 80 percent of the entire western U.S. population of white pelicans, and nearly half of the U.S. population of Yuma clapper rails (an endangered subspecies) utilize this habitat. The Sea is also one of the two nesting areas in the western US for gull-billed terns, a bird proposed for listing as a threatened species. From a fishery perspective, the Sea has supported eight species of fish, including the federally endangered desert pupfish and four important sport fishes (Tilapia, Bairdiella, Sargo, and Orangemouth Corvina).

While citizens throughout the U.S. are likely to have positive use and non-use values for preserving ecosystem services at the Salton Sea, geographic proximity likely plays some role in influencing the magnitude of these values. While there is an obvious connection between use value and proximity, particular types of non-use values (e.g., option value, altruistic value, and bequest value) are likely to be influenced by proximity as well. From a regional or national perspective, then, other states along the Pacific Flyway—Washington, Oregon, and Arizona—are likely to have fairly high non-market values for Salton Sea preservation. Furthermore, given that Nevada is contiguous with California and has a major metropolitan center less than a one-day drive from the Salton Sea, they too likely have large non-market values for Sea preservation.

III.2 The Contingent Valuation Method and Non-use Values

Much, if not most, of the value and benefits of preserving the Salton Sea likely is represented by non-market values, and in particular, the non-use value component of total value. In the studies presented below from which we identify possible values associated with Salton Sea restoration, the Contingent Valuation Method (CVM) is often used. CVM is one of the most popular methods for estimating non-market values, and the most popular method for estimating non-use values as it is one of two methods that estimate these values.[10] As a stated preference method, CVM uses a survey to create a realistic, albeit hypothetical, market where peoples' values for a good or service are expressed. CVM is well-suited for estimating the preservation value associated with the Salton Sea as it allows estimation of total value of any particular good or service, or habitat, rather than components of that value. CVM is a well-accepted technique for valuing non-market goods and services, with there being far greater than 1600 CVM studies estimating non-market values in over 40 countries (Carson et al. 1994). The U.S. DOI has adopted CVM to measure non-market values for damages under CERCLA, while NOAA has endorsed the use of this method for damage assessment under the Oil Pollution Act of 1990; it is also recommended by the U.S. Water Resources Council (1979) for use in benefit-cost analysis.

CVM surveys consist of four main elements. The first element is a description of the program the respondent is asked to value or vote upon. This element often involves a description of the baseline services with no action, and an improved level of services with some type of policy action. Identifying the conditions of the "no-action" alternative and other restoration options will require research by the physical and biological scientists on this team. The second element of the CVM is specifying a mechanism for eliciting value or choice. There are a variety of options for eliciting value, the most well-accepted being a referendum type question that asks the respondent to vote yes or no to a specified price or prices. A "payment vehicle" describing the manner in which the hypothetical payments are collected is the third element. Such vehicles have included higher taxes or utility bills, or a payment into a trust fund (Loomis et al. 2000). The fourth element consists of collecting information on respondent attitudes and characteristics including socioeconomic characteristics and environmental attitudes.

It should be mentioned that the measurement of non-use values, and in particular using CVM to measure non-use values, has generated controversy. In theory most economists seem to agree that non-use values are indeed a legitimate value; in practice, though, there is concern as to the reliability of such estimates since non-use values entail no actual observable use (Hausman 1993). In an effort to assess the reliability of CVM in measuring non-use values, NOAA convened a panel of prominent social scientists co-chaired by two Nobel Laureate economists. The panel concluded that if CVM practitioners follow a certain set of conditions, the results obtained from CVM are likely to be reliable (Arrow et al. 1993) and a useful starting point for administrative and judicial decisions. Subsequent research has discussed issues associated with the conclusions of the NOAA panel, and provided additional procedures that ensure CVM reliability (Hanemann 1994). There is precedent at the federal levels for acknowledging and incorporating non-use values into economic analysis. The U.S. DOI under CERCLA, and NOAA under the Oil Pollution Act of 1990, both endorse including non-use values in their economic analyses associated with measuring the loss in value from chemical and oil spills.

[10] For a complete description of this method, see Freeman (2003).

IV. Case Studies of Non-Market Benefits Estimates for Ecosystem Services

The most accurate and reliable assessment of the non-market benefits provided by the ecosystem services of the Salton Sea would require a primary valuation study. Such a study would involve a detailed survey of a sample of the population of individuals who potentially benefit from the ecosystem services of the Sea. This sample would include both users of the Sea (e.g., birders, anglers, hunters) as well as people who have not used the Sea and who may not even plan to use it, but who nonetheless derive benefits from the flow of ecosystem services in the form of non-use value. The survey data would form the basis for a statistical analysis of individual values, which would then be extrapolated from the survey sample to the relevant population to determine the aggregate benefit provided to the public by the ecosystem services of the Sea.

Currently it is not possible to conduct a primary valuation study for the Salton Sea because both time and funding are insufficient. But it is possible to examine the results of previous studies of similar resources in order to gain a better understanding of the likely magnitudes of non-market benefits derived from the Sea. The use of information from previous primary valuation studies to inform current decisions is known as "benefit transfer" (Rosenberger and Loomis 2003).

Generally the initial steps in any benefit transfer involve: (1) defining the policy context; (2) conducting a thorough literature review; and (3) screening and evaluating the previous research studies. Subsequently, various statistical tools can be brought to bear on the estimates derived in the previous studies in order to "transfer" the information to the case at hand. Relatively simple applications involve calculating an average per-unit value from the previous studies and using that quantity to approximate the per-unit value in the current application. This is often called "value transfer." More complex analyses involve using the previous studies to estimate a "benefit function" that accepts as inputs the characteristics of a resource and provides as output a value estimate. This is often called "function transfer" (for an example involving wetlands, see Brander et al. 2006).

The purpose of this report is to accomplish steps (1) – (3) and then to provide some preliminary estimates using the value transfer method that suggest the likely magnitude of non-market benefits provided by the Salton Sea. These estimates are preliminary because we are unable to undertake a formal statistical analysis of the previous research studies at this time. However, our approach conforms to accepted benefit transfer practices.

IV.1 Research Methodology and Literature Search Strategy

To identify previous valuation studies with potential relevance for the Salton Sea, we undertook a thorough search of the environmental and natural resource economics literature on ecosystem service valuation. We focused on the types of services that tend to benefit geographically dispersed populations, rather than just the local population residing in the immediate vicinity of the resource.[11] Our search included: (1) the EconLit database, which is the American Economic

[11] It is worth emphasizing that the purpose of this report is not to focus on the types of values the Sea provides to its local resident population, but rather the types of values it provides to a much broader set of individuals residing in California, throughout the U.S., and perhaps even in other countries.

Association's electronic bibliography and the main repository for academic research in all economics disciplines, including over 782,000 records; (2) the Environmental Valuation Reference Inventory (EVRI), which is maintained by Environment Canada and includes over 1,700 economic valuation studies; (3) Google Scholar, which provides access to potentially relevant papers published in disciplines other than economics that may not be included in the preceding databases; and (4) our own private collections of literature on natural resource valuation. We searched for studies that addressed combinations of the following topics: existence, option, preservation, bequest, altruistic, passive use, or non-use value; birds, fish, endangered, or threatened species; ecosystem, wetland, flyway, habitat, or biodiversity; waterfowl hunting; Mono Lake, San Joaquin Valley, Owens Lake, Great Salt Lake, Aral Sea, or San Diego National Wildlife Refuge; or contingent valuation.

IV.2 Results and Interpretation

Our initial searching and screening of these sources and topics produced around 70 studies. Our secondary screening narrowed the list to 23 studies of which 20 included at least one value with potential relevance for the Salton Sea. These 23 studies are summarized in table 1. They also are grouped according to topical similarity: San Joaquin Valley (7 studies), Mono Lake (3 studies), endangered species (5 studies), waterfowl hunting (3 studies), and other (5 studies).

Table 1 is organized as follows. The first column provides the bibliographic source. We were able to locate copies of 21 of the 23 studies; for the remaining 2 studies we relied on summaries provided by EVRI. The second column summarizes the most relevant valuation information from each study: typically the resource(s) that was (were) valued, the relevant population, and the reported value estimate(s). In this column we also translate reported values to current values by adjusting each reported estimate to 2006 dollars using the U.S. Bureau of Labor Statistics' Consumer Price Index (U.S. Department of Labor 2006). The third column identifies the relevance of each study for the Salton Sea and the fourth column provides additional comments.

IV.2.a San Joaquin Valley Studies

Before it was intensively developed for agricultural and urban uses, the San Joaquin Valley (SJV) provided habitat for between 5 and 10 million resident and migratory waterfowl and 100,000 spawning Chinook salmon annually (Jones & Stokes Associates (JSA) 1990). By the mid 1980s, the bird population had declined to nearly 500,000, the salmon population had declined to approximately 30,000, and about 90% of all wetlands in the SJV had been lost (JSA 1990). As part of an effort to address the problem of agricultural drainage in the SJV and its impacts on natural resources, a contingent valuation study was conducted by Jones & Stokes Associates, Inc. (JSA 1990) to estimate the economic values associated with alternative fish and wildlife programs. Here we review this study (the JSA-SJV study) and the analyses it spawned.

The JSA-SJV study surveyed selected households in California (both within and outside of the SJV), Oregon, Washington, and Nevada in order to determine estimates of both use and non-use values. By focusing on these states, the study captured values held by residents in the heart of the Pacific Flyway, of which the SJV is an important part. Clearly residents in other states and countries may also benefit from the ecosystem services of the SJV, but this study focused on the

region where individual values arguably could be highest. The values estimated by the study later were used to determine the economic efficiency of transferring water from existing uses, such as agriculture, to wetlands and the San Joaquin River.

The JSA-SJV study focused on five possible environmental programs and asked respondents to state whether they would vote for each program if it would cost their household some additional amount in taxes each year. The programs were (JSA 1990):

- Wetlands habitat and wildlife maintenance program. Prevents a 70% decline in high-quality wetlands habitat (from 85,000 to 27,000 acres); prevents an 85% decline in resident bird populations and a 65% decline in migratory bird populations; maintains other threatened and endangered species in the SJV at their current population levels.
- Wetlands habitat and wildlife improvement program. Increases high-quality wetlands habitat by 45% (from 85,000 to 125,000 acres); increases resident bird populations by 40% and migratory bird populations by 45%; increases populations of other threatened and endangered species in the SJV by about 50%.
- Wildlife contamination control maintenance program. Prevents an increase (from 70% to 95%) in the percentage of the SJV's resident bird population that is regularly exposed to harmful levels of contamination.
- Wildlife contamination control improvement program. Reduces (from 70% to 20%) the percentage of the SJV's resident bird population that is regularly exposed to harmful levels of contamination.
- San Joaquin River and Salmon improvement program. Increases annual number of spawning Chinook salmon from less than 100 to 15,000; increases commercial salmon catch by about 6% and recreational catch by about 5%; improves habitat for resident and migratory bird populations; improves wildlife viewing opportunities and scenic quality; improves opportunities for water-based recreation (rafting, canoeing, kayaking).

The data collected by the JSA-SJV study was used by six of the seven *San Joaquin Valley* studies listed in table 1. The six studies differ in terms of their statistical methods, their relevant populations (some use all respondents, one uses only California residents, one uses only SJV residents, one uses non-SJV California residents), and their main foci (one focuses on distance, another on substitution effects across the five programs). The seventh study in this section uses a different data set—a survey of visitors to SJV wetlands—to estimate use value.

The relevance of these studies for the Salton Sea is clear. Each assesses use and/or non-use values held by western U.S. residents for maintaining or improving ecosystem services in the California section of the Pacific Flyway. Each focuses on wetlands habitat and bird populations. Several demonstrate significant value held by residents who do not reside in the immediate vicinity of the resource. All of these characteristics are applicable to the case of the Salton Sea.

San Joaquin Valley Studies: Values

Using the information summarized in table 1, we can generate a range of estimates for the current annual value of 1,000 acres of SJV wetlands to an average household (in 2006 dollars):[12]

For the average household in CA:
- Annual value of 1,000 acres of SJV wetlands saved: $4.31
- Annual value of 1,000 acres of SJV wetlands created: $6.15-$10.33

For the average household in OR, WA, and NV:
- Annual value of 1,000 acres of SJV wetlands saved: $2.59
- Annual value of 1,000 acres of SJV wetlands created: $4.18-$6.55

For the average household in CA, OR, WA, and NV:
- Annual value of 1,000 acres of SJV wetlands saved: $4.26
- Annual value of 1,000 acres of SJV wetlands created: $10.20

Extrapolating the per-household values to the number of households reported in the 2000 census (U.S. Department of Commerce 2001), which is a conservative estimate of the current number of households, gives (in 2006 dollars):

For all households in CA:
- Annual value of 1,000 acres of SJV wetlands saved: $49.6 million
- Annual value of 1,000 acres of SJV wetlands created: $70.7-$118.9 million

For all households in OR, WA, and NV:
- Annual value of 1,000 acres of SJV wetlands saved: $11.3 million
- Annual value of 1,000 acres of SJV wetlands created: $18.2-$28.5 million

For all households in CA, OR, WA, and NV:
- Annual value of 1,000 acres of SJV wetlands saved: $67.6 million
- Annual value of 1,000 acres of SJV wetlands created: $161.8 million

Using the lowest estimates, the current annual value of 1,000 acres of SJV wetlands is:

- $49.6 million to all households in CA
- $11.3 million to all households in OR, WA, and NV
- $67.6 million to all households in CA, OR, WA, and NV

San Joaquin Valley Studies: Summary

To the extent wetlands at the Salton Sea provide ecosystem services similar to those provided by wetlands in the SJV, and to the extent people value these services similarly, a conservative

[12] This analysis assumes a constant per-acre value and does not consider statistical confidence intervals that may have been reported in the original studies.

estimate of the current state-wide annual value of 1,000 acres of wetland habitat at the Salton Sea is approximately $50 million. Applying this estimate to each of the eight restoration alternatives implies the following state-wide annual values:

- Alternative 1: $1.9 billion for 38,000 acres of Saline Habitat Complex.
- Alternative 2: $3.75 billion for 75,000 acres of Saline Habitat Complex.
- Alternative 3: Unknown value for 61,000 acres of Marine Sea.
- Alternative 4: $4.4 billion for 88,000 acres of Concentric Lakes that would serve a similar role as the Saline Habitat Complex.
- Alternative 5: $2.275 billion for 45,500 acres of Saline Habitat Complex; unknown value for 62,000 acres of Marine Sea.
- Alternative 6: $1.45 billion for 29,000 acres of Saline Habitat Complex; unknown value for 74,000 acres of Marine Sea.
- Alternative 7: $0.6 billion for 12,000 acres of Saline Habitat Complex; unknown value for 104,000 acres of Marine Sea
- Alternative 8: $0.9 billion for 18,000 acres of Saline Habitat Complex; unknown value for 83,000 acres of Marine Sea.

Assuming any of these alternatives would adequately restore the ecosystem services provided by the Sea and prevent future degradation, Alternative 7 suggests that the state-wide value of preserving the Sea is at least $0.6 billion annually and probably significantly higher due to the unknown value associated with the large Marine Sea. Alternatives 1, 2, and 4 suggest the state-wide value is between $1.9 and $4.4 billion annually. We believe the latter range is more indicative of the actual value.

However, caution should be used in transferring any of the estimated SJV values directly to the Salton Sea. Despite their many similarities, the Salton Sea and the SJV are different places marked by different characteristics. People's perceptions of them may differ and therefore their values may differ. The JSA-SJV study also was conducted 17 years ago when the population of the western U.S. was different than it is today. Although none of these arguments should be interpreted as justification for necessarily discounting the values reported in table 1 (indeed, as wetland habitat along the Pacific Flyway becomes more scarce (Dahl et al. 1997; Friend 2002), its value is likely to rise; furthermore, as people become wealthier, their willingness to pay for preservation efforts tends to increase), they should be interpreted as rationale for treating the value transfer as a *suggestive* estimate. A significantly more accurate estimate could be obtained from a primary valuation study of the Salton Sea.

IV.2.b Mono Lake Studies

Mono Lake is a 760,000 year-old saline lake which historically contained about 4.3 million acre-feet of water with an average depth of around 78 feet and an approximate surface area of 54,700 acres (Mono Lake Committee 2006; JSA 1993). Since 1941, the City of Los Angeles has been using the lake's natural inflow as a water source when it extended the first Los Angeles aqueduct north into the Mono Basin. When the second Los Angeles aqueduct was completed in 1970, the city began diverting its full allocation of 100,000 acre-feet of water each year (Loomis 1987). Due to both water diversions and drought, the lake level fell significantly and the ecosystem—

which provides nesting habitat for substantial portions of the California population of California gulls and the world population of Eared Grebes—became increasingly stressed (Loomis 1987). The scenic quality of the lake and its suitability as a recreational resource also were damaged. A series of court cases eventually established that the State of California must balance its enforcement of the right to divert water against its duty to steward natural resources, and that this balancing may involve modifications to existing water rights when diversion causes unavoidable damages (Loomis 1987).

To help inform the debate regarding the definition of "balance," a contingent valuation study was conducted to determine the public benefits derived from the Mono Lake ecosystem (Loomis 1987). After reviewing this study, the California State Water Resources Control Board (the State Water Board) required an even more thorough non-market valuation study as part of the Environmental Impact Report (EIR) for the Mono Basin Water Rights Review. This study was conducted by Jones & Stokes Associates, Inc. (JSA 1993) and also included a contingent valuation survey. The two contingent valuation studies were similar but the values reported in the EIR (the JSA-Mono Lake study) generally were more conservative.

Both studies surveyed selected households in California in order to estimate both use and non-use values associated with Mono Lake.[13] As in the case of the SJV wetlands, residents in other states and countries may also benefit from the ecosystem services provided by Mono Lake; but these studies again focused on the region where individual values are probably highest. In the Mono Lake case, this region coincided with the political entity charged with balancing the costs and benefits of competing uses. The values estimated by these studies, particularly the JSA-Mono Lake study, were used to assess how much the public should invest in water conservation practices and/or reallocate existing diversions from lower to higher valued uses.

The key issue in the Mono Lake case is the lake elevation, which is directly linked to the scenic quality of the lake, recreation opportunities, water quality, air quality, habitat suitability and food availability for birds, and water supply for Los Angeles. Therefore each of these studies developed alternative lake elevation scenarios to be evaluated by respondents. Each lake elevation corresponded to a set of conditions that were described to respondents who were then asked questions about their preferences for the different scenarios. Loomis also conducted a follow-up study (Loomis 1989) to determine if values had changed through time.

Mono Lake Studies: Values

In 1994 the State Water Board established a target lake elevation of 6,392 feet. Although this level is about 25 feet below pre-1941 levels, the Board determined that this level would adequately restore the ecosystem services and prevent future degradation. Using the information summarized in table 1, we can generate a range of estimates for the current annual value of maintaining an "ecologically adequate" lake level, as defined by the State (in 2006 dollars):[14]

For the average household in CA:

[13] The JSA-Mono Lake study also conducted a separate regional assessment of recreation benefits, but the recreation benefits that are specific to Mono Lake also are included in the contingent valuation estimates.

[14] Again we do not consider statistical confidence intervals that may have been reported in the original studies.

- Annual value of maintaining a 6,387-foot elevation (Loomis 1987): $288-$656
- Annual value of maintaining a 6,387-foot elevation (Loomis 1989): $199-$252
- Annual value of maintaining a 6,390-foot elevation (JSA 1993): $131

It is important to note that these values are relative to a "no-action" scenario that was specified in each study. That is, these values represent average household willingness to pay to achieve the specified lake level *rather* than allow the lake level to decline to the no-action level. As table 1 shows, the no-action level specified by Loomis (6,342 feet) was much lower than the no-action level specified in the EIR (6,372 feet). We suspect the relatively higher values derived by Loomis were largely due to this difference: with more at stake, people were willing to pay more.

Extrapolating these per-household values to the number of households reported in the 2000 census (U.S. Department of Commerce 2001), which is a conservative estimate of the current number of households, gives (in 2006 dollars):

For all households in CA:

- Annual value of maintaining a 6,387-foot elevation (Loomis 1987): $3.3-$7.5 billion
- Annual value of maintaining a 6,387-foot elevation (Loomis 1989): $2.3-$2.9 billion
- Annual value of maintaining a 6,390-foot elevation (JSA 1993): $1.5 billion

Mono Lake Studies: Summary

To the extent the ecosystem services provided by a restored Mono Lake and a restored Salton Sea to the residents of California are similar, and to the extent people value these services similarly, a conservative estimate of the current state-wide value of adequate restoration and preservation of the Salton Sea is approximately $1.5 billion annually.

However, as before, caution should be used in transferring any of these values directly to the Salton Sea. Although Mono Lake and the Salton Sea exhibit many of the same important characteristics, they also exhibit important differences that have not been quantified here. People's perceptions of these resources also may differ and therefore their values may differ. Both the Loomis study and the JSA-Mono Lake study were conducted 15-20 years ago when the population of California was different than it is today. Again, these arguments should not be interpreted as justification for discounting or inflating the values in table 1, but they should be interpreted as strong motivation for treating the value transfers as *suggestive* estimates. A significantly more reliable estimate could be obtained from a primary valuation study of the Salton Sea.

IV.2.c Endangered Species Studies

Table 1 presents five studies of endangered species preservation. Four of these studies are primary valuation studies and one is a meta-analysis of previous work. The species examined by the four primary valuation studies include: the Riverside fairy shrimp, the whooping crane, the Mexican spotted owl, and the striped shiner. Although the relevance of each study for the Salton Sea is provided in the table, both individually and as a whole the values estimated by these studies are not as informative or as transferable as those for the SJV and Mono Lake. Generally

this is because the SJV and Mono Lake studies focus on whole ecological systems that provide a myriad of benefits to the public, whereas these studies focus on the value of preserving individual species.[15] The SJV and Mono Lake studies therefore provide more reliable assessments of the total non-market value associated with a resource like the Salton Sea. Our discussion of the endangered species studies, therefore, is more limited.

As a group, these studies generally demonstrate significant non-use value held by U.S. residents (or subsets thereof) for preserving endangered bird and fish species. Two of these species—the Riverside fairy shrimp, which is native to Southern California, and the striped shiner—could be characterized as obscure or uncharismatic but potentially important components of the food web. This is particularly true for the fairy shrimp which is an important food source for migratory birds (Stanley 2005). Similarities with the Salton Sea are evident.

It is important to note that it would not be appropriate to simply add the value of species preservation to an estimate of ecosystem value similar to those presented above because doing so likely would involve double-counting certain benefits. However, it is reasonable to expect that people place higher values on ecosystem preservation efforts when an endangered species is involved *ceteris paribus*.[16] The presence of multiple threatened and endangered species at the Salton Sea, including the Yuma clapper rail and the brown pelican, thus would tend to increase preservation values.

Lastly, it is also worth noting that Stanley (2005) argues for national support of species preservation efforts because the benefits of such efforts tend to be geographically wide-spread. A primary valuation study of the Salton Sea that includes residents from throughout the western U.S. likely would capture a significant portion of this dispersed value.

IV.2.d Waterfowl Hunting Studies

Upon first consideration, the benefits provided by the Salton Sea to waterfowl hunters might seem to comprise a relatively small portion of its total non-market value. This would seem to be especially true if one considers only hunting trips taken to the Sea itself. But the Sea is an important component of the Pacific Flyway. The characteristics of the Sea help to determine the types and numbers of birds using the Flyway and thus affect the quantity and quality of hunting trips taken throughout the Flyway. In other words, just as preservation efforts at the Sea provide non-use value for residents who live far away and may never visit the Sea, such efforts also provide use value for hunters who also never visit the Sea but who hunt elsewhere in the Flyway.

According to the U.S. Fish and Wildlife Service, nearly 2.5 million hunting trips were taken for migratory birds in the Pacific Flyway states of CA, OR, WA, and NV during 2001 (U.S. Department of the Interior 2001). Using the most conservative estimate of the net benefit of a

[15] Preservation of a species typically involves preservation of its habitat which likely generates other benefits. However, the contingent market that must be created to assess the value of preserving a species tends to be different from the market created to assess the value of preserving habitat that contains a species; therefore the estimated values tend to be different.

[16] We are unable to find statistical evidence that supports this reasoning.

trip from table 1 ($47), the current annual net value of hunting migratory birds in these states is approximately $115 million.[17]

The portion of this net value that can be attributed to the ecosystem services provided by the Salton Sea is unclear. It has been shown that hunters value more bird sightings (Duffield and Neher 1991), so to the extent the Salton Sea ecosystem supports the migratory bird population of the Flyway, it adds to the value of each trip currently taken (and thus to the total value of hunting). Higher bird numbers may also encourage more trips to be taken, which also would increase the total value of hunting in the Flyway.[18] Furthermore, as the total amount of habitat in the Pacific Flyway decreases, each remaining refuge plays an increasingly important role in sustaining the bird population. Less habitat generally means less food, fewer nesting sites, and increased risk of disease due to the effects of concentrating the population in relatively few areas.

As before, it is important to note that it would not be appropriate to add the value of hunting in the Flyway to an estimate of ecosystem value because doing so likely would involve double-counting certain benefits. Rather, we highlight this use value to emphasize that both use and non-use values provided by the Sea are probably both large in magnitude and geographically widespread. A contingent valuation study that includes residents throughout the Pacific Flyway could capture this aspect of preservation value.

IV.2.e Other Studies

The remaining five studies in table 1 cover a range of subjects, each related to the Salton Sea. Three are primary valuation studies of Pacific coast seabirds, migratory birds in the Central Flyway, and wetlands in the northeastern U.S. One is a meta-analysis of wetland valuation studies. Notably, the study by Loomis (2000) emphasizes the diffuse nature of benefits derived from resource preservation programs. For six different programs, the study estimates the fraction of total national value that is held by residents within the state(s) where the resource is located. The study finds that, on average, state residents hold only 13% of the total value, with the remaining benefits accruing to out-of-state residents. For California, the fraction is slightly higher at 18%, and it is not possible to rule-out percentages as high as 100% for two of the three California programs considered. Nonetheless, these results reinforce the argument by Stanley (2005) that national support for preservation efforts typically can be justified on the basis of geographically wide-spread benefits. This is likely to be true especially for large-scale efforts.

IV.3 Summary of Results

Our review of the relevant literature produced 23 studies of which 20 contain at least one value which is potentially relevant for the Salton Sea. Of these studies, those which address wetlands and wildlife in the San Joaquin Valley and those which address the Mono Lake ecosystem are

[17] Net benefit (or net value) is the difference between the gross benefit derived and the cost incurred. All other values reported in this report are gross benefits, which can be measured as willingness to pay (WTP). Using the estimated (gross) benefit of a hunting trip in the Montana section of the Pacific Flyway from table 1 ($140) yields a current annual value of $342 million for hunting in these four Flyway states.

[18] Duffield and Neher (1991) examined this possibility but did not find a statistically significant effect. We are unable to find statistical evidence that supports this reasoning.

most relevant and provide the most useful benefits estimates. Keeping in mind the uniqueness of the Salton Sea—which we believe tends to increase its value while also making it difficult to transfer benefits estimates from previous research—and the caveats we have provided throughout this report, we believe that a conservative order-of-magnitude estimate of the non-market benefits provided to the residents of California by a restored and preserved Salton Sea would be in the range of $1-$5 billion annually. This is an annual value expressed in 2006 dollars. It is largely based on the $1.9-$4.4 billion benefit estimate calculated from the SJV studies and on the $1.5 billion benefit estimate calculated from the Mono Lake studies. This estimated range includes both use and non-use value, but probably mostly non-use value.

When considering whether to invest in a project that will generate returns for many years into the future, economists regularly convert all future payments into present values to determine whether the investment is expected to produce a positive net return. By specifying a discount rate and a time horizon, and making the conservative assumption that the nominal annual benefit derived from the Sea remains constant through time, we can convert our estimated range of annual benefits into a present value so that it may be more readily compared with anticipated costs. Table 2 provides the present value of $1 billion annually for different discount rates and time horizons. Multiplying each table entry by 5 gives the present value of $5 billion annually for the same combinations of discount rates and time horizons.

Some additional considerations are worth mentioning when interpreting this estimated range of preservation benefits. First, assuming the transferability of the SJV and Mono Lake estimates is high (something we cannot determine with certainty without conducting a similar primary valuation study of the Salton Sea), we are inclined to believe that they probably underestimate the total non-market value of the Sea. We believe the SJV estimates are low primarily because they value only wetland habitat. The other attributes of the Sea clearly have positive values that are not included in this estimate. We believe the Mono Lake estimate is low primarily because the Sea is significantly larger than Mono Lake and seems to provide a wider variety of services to society. Furthermore, we believe the higher Mono Lake estimates by Loomis (1987, 1989) may provide better comparison values for the Sea because they are based on a relatively worse no-action scenario. Compared to the no-action scenario considered in the Mono Lake EIR (JSA 1993), we think the no-action scenario considered by Loomis is more similar to that for the Salton Sea.[19]

However, people's perceptions of the Sea could differ significantly from their perceptions of the SJV wetlands and Mono Lake, and this could lead to lower values being associated with the Sea. Mono Lake, in particular, is a very unique resource with a relatively high degree of scenic quality. We would not be surprised if western U.S. residents generally are more aware of Mono Lake than they are of the Sea, and this, too, could affect aggregate values. There also may be a perception that the SJV wetlands and Mono Lake are more "natural" resources deserving of preservation whereas the current Sea was formed (and continues to be sustained) by human manipulation of the environment. We are not passing judgment on such perceptions; rather we simply are highlighting their role in value determination.

[19] It is also worth noting that the time horizon considered in Loomis' no-action scenario—30 years—is very similar to the expected amount of time it would take the Sea to transition in the absence of a restoration effort.

On the other hand, the Sea is linked to a much larger local economy than is Mono Lake, and it is arguably a much more important part of this economy than are wetlands to the SJV economy. Furthermore, this economy exhibits a high degree of poverty and health problems (Cohen and Hyun 2006) relative to the state-wide averages in California. To the extent people are willing to pay to achieve a more equitable distribution of wealth and well-being in society, this would tend to increase the values derived from preserving the Salton Sea.

Lastly, it is worth noting that the Draft Environmental Assessment and Land Protection Plan for the South San Diego Bay Unit of the San Diego National Wildlife Refuge states, "… values on the order of $10 to $100 per household per year [are] representative of the value California households place on the protection of resources such as South San Diego Bay." (U.S. Department of the Interior 1998, p.75) This range refers to non-use values and was used in the socioeconomic analysis for the Refuge, which also provides habitat in the Pacific Flyway and is in relatively close proximity to the Salton Sea. However, the total amount of protected area being considered at the time was, at most, only 5,000 acres. Converting this range of household values to 2006 dollars, aggregating across all California households (again using the 2000 census figures), and rescaling to 1,000 acres gives a total value in the range of $28 million to $280 million annually. Although we place relatively less faith in the accuracy of this estimate, it nonetheless appears to be consistent with our preceding estimate of $50 million for 1,000 acres.

V. Conclusions

The Salton Sea is a unique, biological diversity habitat that supports an abundance of wildlife. From an avian perspective, and quoting Shuford et al. (2002):

> Various studies indicate the Salton Sea is of regional or national importance to various species groups—pelicans and cormorants, wading birds, waterfowl, shorebirds, gulls and terns—and to particular species—the Eared Grebe, American White Pelican, Double-crested Cormorant, Cattle Egret, White-faced Ibis, Yuma Clapper Rail, Snowy Plover, Mountain Plover, Gull-billed Tern, Caspian Tern, Black Tern, and Black Skimmer.

As Cohen and Hyun (2006) note, in addition over 402 bird species having been recorded in and around the Salton Sea, the Sea provides habitat to two species listed on the Federal Endangered Species List—the Yuma Clapper Rail and the Brown Pelican—and is possibly the most critical wintering habitat for eared Grebes worldwide. Through its role in providing food (e.g., fish), as a roosting or nesting site, or as a stopover or wintering habitat for migratory birds along the Pacific Flyway, Salton Sea provides services to society at the local, state, regional, national, and international levels.

Unfortunately, without substantial human intervention, the Salton Sea will cease to provide such an impressive array of critical, unique, and abundant services. Rising salinity levels, continual inflows of pollution from agricultural drainage and wastewater flows, and a water transfer scheme that threatens to exacerbate salinity rise and inflow reductions will damage and degrade this habitat for roosting and breeding, and eliminate the food source (fish) for many of the bird species. The outcome of this trend in habitat degradation and loss could be significant, for both

the Salton Sea in its ability to serve its historic function as a habitat for both birds and fish, and for the existence and health of particular bird and fish populations themselves.

The objective of this report is to provide an approximate value for what society might gain from restoring and preserving the Salton Sea using a simple benefits transfer approach. While time constraints restricted our ability to perform a specific and complete valuation study of the restoration alternatives for the Salton Sea relative to a baseline with no-action, or to analyze statistically the results from previous studies in a meta-analysis, we were able to obtain valuation estimates from previous studies that did perform such analyses of unique habitats, ecosystems, or endangered and threatened species. Based on the estimated values from a variety of ecosystem or species valuation studies, and assuming the Salton Sea provides similar services or provides habitat to similarly valued individual and threatened species as investigated in these other studies, restoration and preservation of the Salton Sea may be worth between $1 and $5 billion annually to California residents.

Caution is warranted regarding the interpretation of these estimates because they are based on previous studies involving different natural characteristics, different populations, and at different time periods. Yet, *ceteris paribus*, economic theory suggests that loss of substitute habitat, increasing populations in California, the western U.S., and the U.S. as a whole, and increasing real income levels would all put upward pressure on these preservation values. To echo Krutilla (1967) again, these unique natural resources are assets of appreciating value that provide a significant part of the real income of many individuals. Furthermore, most of the studies we analyze are specific to a state or region rather than national in scope. Based on the results of Loomis (2000) who evaluates six different resource preservation programs, residents within the states where each resource is located hold only a fraction of the total national value. Furthermore, as estimated in Loomis and White (1996) through their meta-analysis of valuation studies for rare, threatened, and endangered species, the authors find that even for the most costly endangered species preservation efforts, the benefits are likely to exceed the costs. With these factors in mind, there are many reasons to believe that the estimates developed here are conservative estimates of the national values associated with Salton Sea restoration/preservation.

In conclusion, while the costs of restoring the Salton Sea has been touted as exorbitant, with estimates exceeding $4 or $5 billion, when one considers the possible benefits of these restoration alternatives based on previous studies valuing other threatened ecosystems and species, the benefit-cost ratio, and indeed the net benefits, could very well likely be large. Clearly, for a more accurate representation of the benefits associated with restoration, a more specific and detailed valuation study of the restoration alternatives associated with the Salton Sea would need to be performed. Yet with limited time before the legislature makes a decision based on the alternatives presented to it, information on the possible returns from restoring the Salton Sea may be gleaned from previous studies that have confronted similar situations. Time and time again, it seems to be the case that when the non-market benefits of these unique natural resources are placed on equal footing with the costs of restoration, preservation seems to come out as the economically efficient strategy. And from our perspective, we see no reason why such benefits should not be given standing in light of such precedence by other agencies, mandates, and legislation at both the state and federal level.

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Table 1. Previous Environmental Benefits Estimates with Potential Relevance for the Salton Sea Restoration Project.

Source	Summary	Relevance	Comments
San Joaquin Valley			
Jones & Stokes Associates, Inc. 1990. Final Report: Environmental Benefits Study of San Joaquin Valley's Fish and Wildlife Resources. (JSA 87-150). Sacramento, CA. Prepared by J.B. Loomis, W.M. Hanemann, and T.C. Wegge.	Estimates that the average household in CA would be willing to pay $154 annually to avoid losing 58,000 acres of **wetlands in the SJV,** or $254 annually to obtain 40,000 additional acres. Estimates that the average household in OR, WA, and NV would be willing to pay $92 annually to avoid the same loss, or $161 annually to obtain the same increase. *Current values in CA: $250 or $413 annually per household* *Current values outside CA: $150 or $262 annually per household*	Evidence of significant value held by western U.S. residents for wetlands maintenance and improvement in the California section of the Pacific Flyway. Demonstrates significant value beyond the vicinity of the resource.	Baseline wetland acreage was 85,000 (about 10% of original wetland acreage in the SJV). Total value probably consists mostly of non-use values. Approximately 78% of the aggregate value is held by CA residents living outside the SJV. Suggest caution applying these results to the Salton Sea due to different population & site characteristics.
Ibid.	Estimates that the average household in CA would be willing to pay $188 annually to avoid increasing the **population of resident SJV wildlife exposed to agricultural drainage contaminants** to 95%; or $313 annually to reduce the exposed population to 20%. Estimates that the average household in OR, WA, and NV would be willing to pay $93 annually to avoid the same increase, or $131 annually to obtain the same decrease. *Current values in CA: $306 or $509 annually per household* *Current values outside CA: $151 or $213 annually per household*	Evidence of significant value held by western U.S. residents for limiting or mitigating the effects of agricultural drainage on resident wildlife populations in California. Demonstrates significant value beyond the vicinity of the resource.	Baseline exposure level was 70%. Total value probably consists mostly of non-use values. Approximately 80% of the aggregate value is held by CA residents living outside the SJV. Suggest caution applying these results to the Salton Sea due to different population & site characteristics.
Loomis, J. et al. 1991. Willingness to Pay to Protect Wetlands and Reduce Wildlife Contamination from Agricultural Drainage. In A. Dinar and D. Zilberman, eds., *The Economics and Management of Water and Drainage in Agriculture*. Boston: Kluwer.	Estimates that California residents would be willing to pay $1.52 billion annually to avoid losing 58,000 acres of **wetlands in the SJV**; or $2.50 billion annually to obtain 40,000 additional acres. *Current values: $2.5 or $4.1 billion annually to California residents alone*	Evidence of significant aggregate value held by California residents for wetlands maintenance and improvement in the California section of the Pacific Flyway.	Baseline wetland acreage was 85,000. Total value probably consists mostly of non-use values. Suggest caution applying these results to the Salton Sea due to different population & site characteristics. Same results provided in Jones & Stokes (1990).

Source	Summary	Relevance	Comments
Ibid.	Estimates California residents would be willing to pay $1.85 billion annually to avoid increasing the **population of resident SJV wildlife that is exposed to agricultural drainage contaminants** to 95%; or $3.08 billion annually to reduce the exposed population to 20%. *Current values: $3 or $5 billion annually to California residents alone*	Evidence of significant aggregate value held by California residents for limiting or mitigating the effects of agricultural drainage on resident wildlife populations in California.	Baseline exposure level was 70%. Total value probably consists mostly of non-use values. Suggest caution applying these results to the Salton Sea due to different population & site characteristics. Same results provided in Jones & Stokes (1990).
Hanemann, M. et al. 1991. Statistical Efficiency of Double-Bounded Dichotomous Choice Contingent Valuation. *American Journal of Agricultural Economics* 73:1255-63.	Estimates the average household in CA, OR, WA, and NV would be willing to pay $152 annually to avoid losing 58,000 acres of **wetlands in the SJV**; or $251 annually to obtain 40,000 additional acres. *Current values: $247 or $408 annually per household in western U.S.*	Evidence of significant value held by western U.S. residents for wetlands maintenance and improvement in the California section of the Pacific Flyway.	Baseline wetland acreage was 85,000. Total value probably consists mostly of non-use values. Implements a more efficient statistical method. Suggest caution applying these results to the Salton Sea due to different population & site characteristics.
Ibid.	Estimates the average household in CA, OR, WA, and NV would be willing to pay $187 annually to avoid increasing the **population of resident SJV wildlife that is exposed to agricultural drainage contaminants** to 95%; or $308 annually to reduce the exposed population to 20%. *Current values: $304 or $501 annually per household in western U.S.*	Evidence of significant value held by western U.S. residents for limiting or mitigating the effects of agricultural drainage on resident wildlife populations in California.	Baseline exposure level was 70%. Total value probably consists mostly of non-use values. Implements a more efficient statistical method. Suggest caution applying these results to the Salton Sea due to different population & site characteristics.
Creel, M. and J. Loomis. 1992. Recreation Value of Water to Wetlands in the San Joaquin Valley: Linked Multinomial Logit and Count Data Trip Frequency Models. *Water Resources Research* 28(10):2597-2606.	Estimates that the annual benefits derived by the average visitor to **wetlands in the SJV** by recreation type: Wildlife viewers….$128-$152 annually Anglers…….$126-$137 annually Hunters…….. $149-$159 annually *Current values per visitor:* *Wildlife viewer……$209-$248 annually* *Angler……..$205-$223 annually* *Hunter…….. $243-$259 annually* Also, estimates aggregate value for all 14 sampled destinations (current annual value ≈ $130 million).	Evidence of significant use value associated with wetlands in the California section of the Pacific Flyway.	Range of values due to different assumptions of statistical model. Suggest caution applying these results to the Sea due to different population & site characteristics. Estimates that increasing wetland water allocations to optimal levels would increase benefits by around 17%. Finds that values for multi-purpose users are greater than the sum of the values for single-purpose users. These values should not be added to the preceding estimates.

Source	Summary	Relevance	Comments
Hoehn, J.P. and J.B. Loomis. 1993. Substitution Effects in the Valuation of Multiple Environmental Programs. *Journal of Environmental Economics and Management* 25(1): 56-75.	Estimates that the average household in the SJV would be willing to pay $120 annually to avoid losing 58,000 acres of **wetlands in the SJV**; or $166 annually to obtain 40,000 additional acres. *Current values: $195 or $270 annually per household in SJV*	Evidence of significant value held by SJV residents for wetlands maintenance and improvement in the California section of the Pacific Flyway.	Baseline wetland acreage was 85,000. Total value probably consists mostly of non-use values. Considers cross-policy substitution effects not addressed by preceding studies, and derives lower values. Suggest caution applying these results to the Sea due to different population & site characteristics.
Ibid.	Estimates that the average household in the SJV would be willing to pay $113 annually to avoid increasing the **population of resident SJV wildlife that is exposed to agricultural drainage contaminants** to 95%; or $184 annually to reduce the exposed population to 20%. *Current values: $184 or $299 annually per household in SJV*	Evidence of significant value held by SJV residents for limiting or mitigating the effects of agricultural drainage on resident wildlife populations in California.	Baseline exposure level was 70%. Total value probably consists mostly of non-use values. Considers cross-policy substitution effects not addressed by preceding studies, and derives lower values. Suggest caution applying these results to the Sea due to different population & site characteristics.
Pate, J. and J.B. Loomis. 1997. The Effect of Distance on Willingness to Pay Values: a Case Study of Wetlands and Salmon in California. *Ecological Economics* 20(3):199-207.	Estimates that the average household in CA would be willing to pay $211 annually to obtain 40,000 additional acres of **wetlands in the SJV**. Estimates that the average household in OR, WA, and NV would be willing to pay $103 annually to obtain the same increase. *Current values in CA: $343 annually per household* *Current values outside CA: $167 annually per household*	Evidence of significant value held by western U.S. residents for wetlands improvement in the California section of the Pacific Flyway. Demonstrates significant value beyond the vicinity of the resource.	Baseline wetland acreage was 85,000. Total value probably consists mostly of non-use values. Estimates how distance from the resource affects value, and calculates values for each state. Suggest caution applying these results to the Salton Sea due to different population & site characteristics.
Ibid.	Estimates that the average household in CA would be willing to pay $223 annually to avoid increasing the **population of resident SJV wildlife that is exposed to agricultural drainage contaminants** to 95%. Estimates that the average household in OR, WA, and NV would be willing to pay $91 annually to avoid the same increase. *Current value in CA: $363 annually/hh* *Current value outside CA: $148 annually/hh*	Evidence of significant value held by western U.S. residents for limiting the effects of agricultural drainage on resident wildlife populations in California. Demonstrates significant value beyond the vicinity of the resource.	Baseline exposure level was 70%. Total value probably consists mostly of non-use values. Calculates values for each state. Suggest caution applying these results to the Salton Sea due to different population & site characteristics.

Source	Summary	Relevance	Comments
An, M.Y. 2000. A Semi-Parametric Distribution for Willingness to Pay and Statistical Inference with Dichotomous Choice Contingent Valuation Data. *American Journal of Agricultural Economics* 82:487-500.	Estimates that the average household in CA but outside the SJV would be willing to pay between $155 and $190 annually to obtain 40,000 additional acres of **wetlands in the SJV**. *Current value: $252-$309 annually per household in CA not in SJV*	Evidence of significant value held by California residents for wetlands improvement in the California section of the Pacific Flyway.	Baseline wetland acreage was 85,000. Total value probably consists mostly of non-use values. Range of values due to different assumptions in statistical model. Suggest caution applying these results to the Sea due to different population & site characteristics.
Mono Lake			
Loomis, J. 1987. Balancing Public Trust Resources of Mono Lake and Los Angeles' Water Right: An Economic Approach. *Water Resources Research* 23(8):1449-1456.	Estimates that the average household in CA would be willing to pay between $3.27 and $7.43 monthly to avoid lowering the **water level in Mono Lake** from 6,372 feet above MSL to 6,342 feet; and between $9.58 and $21.78 monthly to raise it from 6,372 feet to 6,387 feet above MSL. *Current values: $6.12-$13.91 and $17.94-$40.79 monthly per household in CA depending on increase in elevation.*	Evidence of significant value held by California residents for preservation of saline lake habitat that supports migratory waterfowl, including Eared Grebes, in the California section of the Pacific Flyway.	Range of values is due to different assumptions about how to extrapolate individual values to the California population. Total value probably consists mostly of non-use values. The lower numbers are considered conservative estimates. Suggest caution applying these results to the Sea due to different population & site characteristics.
Loomis, J. 1989. Test-Retest Reliability of the Contingent Valuation Method: A Comparison of General Population and Visitor Responses. *American Journal of Agricultural Economics* 71(1):76-84.	Estimates that the average household in CA would be willing to pay between $4.72 and $5.51 monthly to avoid lowering the **water level in Mono Lake** from 6,372 feet above MSL to 6,342 feet; and between $4.12 and $5.89 monthly to raise it from 6,372 feet to 6,387 feet above MSL. *Current values: $8.87-$10.14 and $7.75-$10.84 monthly per household in CA.*	Evidence of significant value held by California residents for preservation of saline lake habitat that supports migratory waterfowl, including Eared Grebes, in the California section of the Pacific Flyway.	Range of values is due to multiple surveys of the same population. Total value probably consists mostly of non-use values. Also surveyed Mono lake visitors and found their values to be about twice as high as non-visitors (reported here). Suggest caution applying these results to Sea due to different population & site characteristics.
Jones & Stokes Associates, Inc. 1993. Environmental Impact Report for the Review of Mono Basin Water Rights of the City of Los Angeles. Draft. May. (JSA 90-171) Sacramento, CA. Prepared for the California State Water Resources Control Board, Division of Water Rights, Sacramento, CA.	Estimates that California residents would be willing to pay $81.90 annually to increase the **Mono Lake water level** from 6,372 feet above MSL to 6,377 feet; and $9.26 annually to increase the water level from 6,377 feet to 6,390 feet above MSL. *Current values: $117.63 and $13.30 annually per resident.*	Evidence of significant value held by California residents for preservation of saline lake habitat that supports migratory waterfowl, including Eared Grebes, in the California section of the Pacific Flyway.	Survey asked respondents to consider slightly different water elevations; authors then adjusted the values to reflect the elevations considered in the EIR (shown here). Total value probably consists mostly of non-use values. Suggest caution applying these results to the Salton Sea due to different population & site characteristics.

Source	Summary	Relevance	Comments
Endangered Species			
Boyle, K.J. and R.C. Bishop. 1987. Valuing Wildlife in Benefit-Cost Analysis: a Case Study Involving Endangered Species. *Water Resources Research* 23:943-950.	Estimates that the average resident of WI would be willing to pay between $4.16 and $5.66 per person annually to prevent the extinction of the **striped shiner**. *Current value: $7.80-$10.62 annually/person*	Evidence of significant value held by U.S. residents for preservation of an unfamiliar and uncharismatic endangered fish species.	Total value probably consists mostly of non-use values. Caution applying these results to the Salton Sea due to different population & site characteristics.
Bowker, J.M. and J.R. Stoll. 1988. Use of Dichotomous Choice Nonmarket Methods to Value the Whooping Crane Resource. *American Journal of Agricultural Economics* 70(2):372-81.	Estimates that respondents in Texas and four major U.S. cities (Los Angeles, Chicago, Atlanta and New York) would be willing to pay between $21 and $70 per person annually to help preserve the **whooping crane**. *Current value: $43-$142 annually/respondent*	Evidence of significant value held by U.S. residents for preservation of endangered bird species.	The relatively wide range of values is due to different assumptions made about the statistical model. Suggest caution applying these results to the Salton Sea due to different population & site characteristics. Respondents may have reported household WTP.
Loomis, J.B. and D.S. White. 1996. Economic Benefits of Rare and Endangered Species: Summary and Meta-analysis. *Ecological Economics* 18(3):197-206.	Authors present a meta-analysis of valuation studies for **rare, threatened, and endangered species**.	Evidence of value associated with rare, threatened, and endangered fish and bird species.	Authors argue that even for the most costly endangered species preservation efforts, the benefits are likely to exceed the costs.
Loomis, J. and E. Ekstrand. 1997. Economic Benefits of Critical Habitat for the Mexican Spotted Owl: A Scope Test Using a Multiple-Bounded Contingent Valuation Survey. *Journal of Agricultural and Resource Economics* 22(2): 356-66.	Estimates that U.S. residents would be willing to pay $1.8-$3.7 billion annually to preserve habitat in AZ, CO, NM, and UT for the **Mexican Spotted Owl**. *Current values: $2.3-$4.8 billion annually*	Evidence of significant value held by U.S. residents for preservation of an endangered bird species.	Range of values is due to different assumptions made about the statistical model. The lower number is a conservative estimate. Suggest caution applying these results to the Salton Sea due to different population & site characteristics.
Stanley, D.L. 2005. Local Perception of Public Goods: Recent Assessments of Willingness-to-Pay for Endangered Species. *Contemporary Economic Policy* 23(2):165-79.	Estimates that the average household in Orange County, CA would be willing to pay $25 annually ($7.5-8 million for the entire county) to preserve the **Riverside fairy shrimp**, which otherwise would likely become extinct within the next 100 years. *Current values: $28 per household, or $8.5-9.0 million county-wide, annually*	The fairy shrimp is a non-charismatic endangered species that is not well-known by the public but is an important food source for migratory birds. Evidence of significant value held by southern California residents for habitat that supports migratory bird populations.	The author also argues for national support of species preservation efforts due to geographically wide-spread benefits. Suggest caution applying these results to the Salton Sea due to different population & site characteristics and/or distance.

Source	Summary	Relevance	Comments
	Waterfowl Hunting		
Brown, G.M. and J. Hammack. 1972. A Preliminary Investigation of the Economics of Migratory Waterfowl. In J.V. Krutilla, ed., *Natural Environments*. Baltimore: Johns Hopkins University Press.	Estimates the net economic value of **waterfowl hunting in the Pacific Flyway** is $25 per trip or $247 per season. *Current values: $145 per trip or $1,432 per season*	Evidence of significant use value associated with serviced provided by bird habitat in the Pacific Flyway.	Relatively old study. "Net economic value" refers to the difference between the benefit of a trip and its cost.
Hay, M. 1988. Net Economic Recreation Values for Deer, Elk, and Waterfowl Hunting and Bass Fishing. *U.S. Dept. of the Interior Fish and Wildlife Service*.	Estimates the net economic value of a **waterfowl hunting trip in the Pacific Flyway** is $25, and that of a **bass fishing trip in California** is $22. *Current values: $47 per trip for hunting and $41 per trip for fishing*	Evidence of significant use value associated with services provided by bird habitat in the Pacific Flyway and fish habitat in California.	Unable to locate publication (summary provided by EVRI). Total number of trips not provided. "Net economic value" refers to the difference between the benefit of a trip and its cost.
Duffield, J. and C. Neher 1991. Montana Waterfowl Hunting, A Contingent Valuation Assessment of Economic Benefits to Hunters. *Montana Department of Fish, Wildlife and Parks*.	Estimates the value of a **waterfowl hunting trip in the Montana section of the Pacific Flyway** is around $140. *Current value: $228 per trip*	Evidence of significant use value held by non-California residents for services provided by Pacific Flyway habitat.	Unable to locate publication (summary provided by EVRI). Total number of trips not provided. Also determines the effects of more/fewer birds on the value of a trip, but not specifically for Pacific Flyway trips.
	Other Studies		
Green, D., et al. 1998. Referendum Contingent Valuation, Anchoring, and Willingness to Pay for Public Goods. *Resource and Energy Economics* 20:85-116.	Estimates respondents in San Francisco, CA would be willing to pay around $64 per person annually to protect 50,000 **Pacific Coast seabirds** from off-shore oil spills. *Current value: $85 per person*	Demonstrates significant value held by California residents for protecting part of an aquatic-based west coast bird population.	The study was conducted primarily to test the contingent valuation method and it showed that WTP can be influenced by question structure. Caution applying these results to a large population or to the Salton Sea due to the survey design characteristics.
Boyle, K.J., et al. 1994. An Investigation of Part-Whole Biases in Contingent-Valuation Studies. *Journal of Environmental Economics and Management* 27(1): 64-83.	Estimates respondents in Atlanta, GA would be willing to pay at least $88 per person to protect 2% of the **migratory bird population in the Central Flyway** (200,000 birds) from presumably certain human-induced mortality. *Current value: $127 per person*	Evidence of significant value held by residents of a geographically separate region for protecting a small portion of a migratory bird population within a single flyway.	The study was conducted primarily to test the contingent valuation method and it showed that WTP did not increase with the number of avoided deaths. Caution applying these results to a large population or to the Salton Sea due to the survey design characteristics.

Source	Summary	Relevance	Comments
Loomis, J. B. 2000. Vertically Summing Public Good Demand Curves: An Empirical Comparison of Economic Versus Political Jurisdictions. *Land Economics* 76(2):312-21.	For six different resource preservation programs, estimates **the fraction of national value held by residents within the state(s)** where the resource is located. Finds, on average, that only 13% of total value is held by state residents.	Evidence of significant value held by out-of-state residents. Resources valued include: three California programs (wetlands, wildlife exposure to agricultural contamination, spotted owl) and three other programs focused on birds, fish, and rare/threatened/endangered species.	Confidence intervals are relatively wide and include 100% of national value for three of the programs, including two in California. Average percent of national value held by California residents is around 18%.
Johnston, R.J., et al. 2002. Valuing Estuarine Resource Services Using Economic and Ecological Models: The Peconic Estuary Study System. *Coastal Management* 30: 47-65.	Estimates that the average household in eastern Long Island, NY would be willing to pay around $0.066 annually to preserve an additional **acre of wetlands in eastern Long Island**. *Current value: $0.087 annually/household*	Evidence of value associated with incremental protection of wetlands.	Suggest caution applying these results to the Salton Sea due to different population & site characteristics. Also, WTP likely includes both use and non-use value.
Brander et al. 2006. The Empirics of Wetland Valuation: A Comprehensive Summary and a Meta-Analysis of the Literature. *Environmental & Resource Economics* 33:223-50.	Authors present a meta-analysis of valuation studies for **wetland services** and estimate a meta-regression that can facilitate benefit transfer.	Evidence of value associated with ecological services provided by wetlands.	Benefit transfer errors average around 74%.

Notes: Current values for individual respondents and/or households are adjusted to 2006 dollars using the U.S. Department of Labor, Bureau of Labor Statistics Consumer Price Index. Aggregate values reported in the table are not adjusted for temporal changes in factors such as population (this does not apply to the main text). SJV = San Joaquin Valley. WTP = Willingness-to-pay. MSL = mean sea level. EIR = Environmental Impact Report. hh = household. NA = not applicable/available.

Table 2. Present Value of $1 Billion Annually for Various Discount Rates and Time Horizons.

Time (years)	Annual Discount Rate (%)									
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
5	4.85	4.71	4.58	4.45	4.33	4.21	4.10	3.99	3.89	3.79
10	9.47	8.98	8.53	8.11	7.72	7.36	7.02	6.71	6.42	6.14
15	13.87	12.85	11.94	11.12	10.38	9.71	9.11	8.56	8.06	7.61
20	18.05	16.35	14.88	13.59	12.46	11.47	10.59	9.82	9.13	8.51
25	22.02	19.52	17.41	15.62	14.09	12.78	11.65	10.67	9.82	9.08
30	25.81	22.40	19.60	17.29	15.37	13.76	12.41	11.26	10.27	9.43
35	29.41	25.00	21.49	18.66	16.37	14.50	12.95	11.65	10.57	9.64
40	32.83	27.36	23.11	19.79	17.16	15.05	13.33	11.92	10.76	9.78
45	36.09	29.49	24.52	20.72	17.77	15.46	13.61	12.11	10.88	9.86
50	39.20	31.42	25.73	21.48	18.26	15.76	13.80	12.23	10.96	9.91
75	52.59	38.68	29.70	23.68	19.48	16.46	14.20	12.46	11.09	9.99
100	63.03	43.10	31.60	24.50	19.85	16.62	14.27	12.49	11.11	10.00

Notes: Table entries are expressed in billions of dollars. Multiply entries by 5 to calculate the present value of $5 billion annually. Multiply by X to calculate the present value of $X billion annually.

DATE: **JANUARY 11, 2007**

TO: **SALTON SEA AUTHORITY (RICK DANIELS)**

FROM: **DEL RIO ADVISORS, LLC (KENNETH L. DIEKER)**

RE: **LOCAL FUNDING ALTERNATIVES**
SALTON SEA RESTORATION PLAN

The purpose of this memo is to lay out, in one document, the potential local funding alternatives that are available to the Salton Sea Authority for use in the restoration of the Salton Sea. Few, if any, of these alternatives are available to any other plan as presented to the State of California Department of Water Resources "DWR". This memo is to be inserted into the Salton Sea Authority plan pursuant to the public comment period that ends January 15th, 2007.

SALTON SEA AUTHORITY

The Salton Sea Authority (the "Authority") is a joint powers authority whose member agencies are the County of Riverside, the County of Imperial, Imperial Irrigation District, Coachella Valley Water District, and the Torres Martinez Tribal Nation ("Member Agencies"). The purpose of the Authority is to implement projects for the restoration and revitalization of the Salton Sea and its environs in accordance with federal and state laws. **The Authority has generated a great deal of member, local agency and general public support for its plan to restore the Salton Sea.** To further the purposes of the Authority, local funding sources can provide for the ongoing operation and maintenance costs of certain specific project facilities that the Authority contemplates constructing. Summarized below are a few of the funding alternatives available to the Authority.

INFRASTRUCTURE FINANCING DISTRICT "IFD" (1)

SCOPE OF AUTHORIZING LEGISLATION

We have reviewed the special legislation that authorizes the Salton Sea Authority to form an infrastructure financing district for the restoration of the Salton Sea (Government Code § 53395.9). The section authorizes an IFD "for the purpose of funding the construction of, and purchasing electrical power for, projects for the reclamation and environmental restoration of the Salton Sea". The grant of authority is broad enough to encompass the construction of currently envisioned structures for the reclamation of the Salton Sea.

The only limitation on that power is that "no public funds accruing to the Salton Sea Authority pursuant to this section shall be utilized for purposes of treating or making potable, agricultural tail waters flowing into the Salton Sea". This exclusion was added, we believe, to forestall a perceived intent by commercial water treatment operators to treat and sell agricultural tail waters. It is doubtful that the exclusion would be read broad enough to preclude use of IFD funds for the construction of wetlands or other passive structures designed in part to improve water quality flowing into the Salton Sea.

(SEE "NEW LEGISLATION")

STEPS TO FORM AN INFRASTRUCTURE FINANCING DISTRICT

We have outlined below the required steps for the formation of an Infrastructure Financing District. The process will require a significant amount of time and effort. The Authority is in constant ongoing discussions with the Member Agencies and each Agency has adopted the Authority Plan individually and in cooperation as Member Agencies.

The formal steps necessary for formation of an infrastructure financing district are:

1. Adoption of a resolution of intention to establish the proposed district, describing the boundaries of the proposed district, the type of public facilities proposed to be financed; and fixing a time and place for a public hearing on the proposal (Government Code §53396.10).

2. A resolution of intention is mailed to each owner of land within the district (Government Code §53395.11).

3. Designate and direct the Authority engineer to prepare an infrastructure plan (Government Code §53395.13) that will include the following:

   a) Shall be consistent with the general plan of the underlying land use jurisdictions;

   b) A map and legal description;

   c) Description of public facilities, including proposed location, timing and cost;

d) A finding that the public facilities are of community wide significance and provide significant benefits to an area larger than the area of the district;

e) A financing section, including specification of the maximum portion of incremental tax revenue of affected taxing entities; and projection of the amount of tax revenues expected to be received;

f) A plan for financing the public facilities, including a detailed description of any intention to incur debt;

g) A limit on the total number of dollars of taxes which may be allocated to the district and a date on which the district will cease to exist;

i) An analysis of the cost to the Authority of providing facilities and services to the area of the district while the area is being developed, and after the area is developed, including analysis of the tax, fees, charges and other revenues expected to be received as a result of the expected development;

j) Analysis of the projected fiscal impact on the district and the associated development upon each affected tax entity;

k) A replacement plan for any units of low mod housing that will be removed or destroyed.

4. The Financing Plan shall be sent to landowners and taxing entities (Government Code § 53395.15);

5. The Authority's designated official shall consult with each affected taxing entity regarding revisions to the plan (Government Code §53395.16);

6. The Authority shall conduct a public hearing (Government Code §53395.17);

7. The Authority shall proceed to hear and pass upon all written and oral objections and may modify the plan (Government Code §53395.18);

8. If each affected taxing entity has adopted a resolution approving the plan, the Authority may adopt the plan (Government Code §53395.19);

9. At the conclusion of the hearing, the Authority may adopt a resolution proposing adoption of the infrastructure financing plan and then submit the proposal to qualified electors of the proposed district in the next general election or in a special election to be held. If at least twelve persons have registered to vote, the vote shall be by registered voters of the proposed district. Ballots for the special election may be distributed by mail (Government Code §53395.20); and

10. The Authority may adopt the infrastructure financing plan and create the district if 2/3rds of the votes are cast in favor (Government Code §53395.23).

COMMUNITY FACILITIES DISTRICTS "CFD" (2)

Under the Mello-Roos Community Facilities District Act of 1982 being Government Code Section 53311 et seq., (the "Mello-Roos Act"), a local agency may levy a special tax to finance certain services and facilities in accordance with the requirements set forth in the Mello-Roos Act. A joint powers authority is considered a "local agency" under the Mello-Roos Act and has all of the authority to accomplish the purposes of the Mello-Roos Act. Government Code §53317.

Operation and maintenance services permitted to be financed under the Mello-Roos Act are limited to: (i) maintenance of parks, parkways, and open space; (2) maintenance and operation of flood and storm protection services; (3) maintenance of school facilities; and (4) operation and maintenance of museums and cultural facilities. Government Code §53313. While the Project contains areas and facilities that could be classified as parks, parkways, open space and flood and storm protection facilities, it also contains facilities and areas that are not classified within those categories. Thus, under current law, the full scope of operation and maintenance costs which the Authority would like to finance could not be funded through a community facilities district without special legislation.

(SEE "NEW LEGISLATION")

Pursuant to the Mello-Roos Act, the boundaries of the community facilities district can encompass any and all parcels located within the jurisdiction of the Authority. Included parcels are designated by the local agency and need not be contiguous. Special taxes are levied according to a rate and method of apportionment (basically, a formula created to spread the tax fairly among the parcels). The rate and method of apportionment of the special tax may exempt properties such as those owned by public agencies and Indian tribes. No special benefit finding is needed for a particular parcel to be taxed.

Special taxes to be levied in community facilities districts require approval by a 2/3's majority of the qualified electors, which in the case of the Authority would be registered voters.

ASSESSMENT DISTRICTS (2)

1. Landscaping and Lighting Districts

The Landscaping and Lighting Act of 1972 (the "LLPD Act"), Streets & Highways Code §22500 et seq., permits public agencies to levy assessments for the purpose of maintaining and operating any improvement permitted under the LLPD Act. A public agency is defined as a city, city and county, county or public corporation formed pursuant to a special act for the performance of governmental functions within limited boundaries. Streets & Highways Code §22533. Pursuant to laws governing joint powers authorities, a joint powers authority is a public entity but not a public corporation. Government Code §6507. As such, the Authority would not be able to levy the assessment. The County of Imperial and the County of Riverside (collectively, the "Member Counties"), Member Agencies of the Authority, could each levy the assessment within its jurisdiction and then transfer the funds to the Authority to finance the ongoing operation and maintenance of the Project.

Operation and maintenance costs allowed to be financed by the LLPD Act include costs allocable to improvements for, among other things, public lighting facilities, landscaping, ornamental facilities, park or recreational facilities. Streets & Highways Code §22525. While certain improvements in the Project which need to be financed could be classified into the categories described above, there are improvements, such as the desalinization plant, which would not fit in those categories.

2. Maintenance Districts

Pursuant to Government Code Section 5820 et seq., any City or County may levy assessments to finance the operation and maintenance of improvements. Similar to the LLPD, the maintenance district law does not permit the Authority to levy assessments. Only Cities and Counties are permitted to levy assessments under this law, thus each Member County would need to levy the assessment within its jurisdiction and then transfer the funds to the Authority to finance the operation and maintenance costs of the Project. As there is no limiting definition for the term "improvements," this law provides broad authority for a City or County to operate and maintain any improvements located within its jurisdiction.

CFD AND ASSESSMENT DISTRICT CONCLUSION

It should be noted that while many of the costs of the operation and maintenance of the Project cannot be directly funded through the use of the CFD or Assessment District mechanisms, we want to point out that these dollars will be used to fund public infrastructure for any new planned development and to some extent the ongoing costs of certain public benefits such as schools, police and fire protection. In addition, should the Authority seek special legislative action to amend the "Mello-Roos Act", the dollars could be used for the direct ongoing operation and maintenance costs of the Project.

NEW LEGISLATION

Infrastructure Financing District

It is the intent of the Authority to seek special legislation to allow for the funding of operation and maintenance of any facilities contemplated above through the use of tax increment generated as part of the IFD. There are some bond counsel firms that feel as if the public agency can form a project area as part of an IFD and collect tax increment thereto but, to the best of our knowledge, no one has yet to issue bonds using that revenue as the source of repayment. We intend to seek, as part of our legislative package, clarifying legislation that specifically allows for the issuance of bonds as part of the Salton Sea Authority IFD.

Community Facilities District ("Mello-Roos Act")

The Mello-Roos Act is another practical funding vehicle as it currently could allow the Authority to fully fund some of the operation and maintenance of the Project on its own, without the Member Counties as intermediaries. The Mello-Roos Act could be amended to include operation and maintenance costs for all of the Authority's improvements. The Authority intends to seek special legislative authority under the Mello-Roos Act to fund the operation and maintenance costs of all of its projects by merely adding a section, limited to the Authority, which expands the permissible items for which special taxes may be used to fund operation and maintenance.

OTHER LOCAL FUNDING SOURCES

The following other local funding sources will require participation by one or more of the Authority member agencies:

Transient Occupancy Tax "TOT"

This is generally a tax charged by a local agency to hotel operators / owners for overnight stays within the agency boundaries. This tax is justified since it can be argued that the transient is using the local public facilities and these dollars will be used to help the ongoing maintenance of the local roads, etc. The Salton Sea is in close proximity to the resort areas of the Coachella Valley. It is anticipated that any new recreational activities will bring with it new hotel and resort developments. It would be the desire of the Authority to collect some TOT for the ongoing maintenance of the Project. Any such agreement would require a tax sharing agreement with either or both member counties (Riverside and Imperial).

Sales Tax

While a City or County has jurisdiction to place a sales tax initiative on the ballot. The Authority does not have such direct ability. However, the Authority will pursue legislative action to allow for the creation of a sales tax district that would allow it to capture all or a negotiated portion of the sales taxes generated through the sale of goods and services within the District Boundaries. The Authority would once again need a tax sharing arrangement with either or both member counties to allow some of these sales tax dollars to remain with the Project.

Community Services District

The Authority is a joint powers agency but could promote the formation of a Community Services District "CSD". This CSD would be used to provide services to local residents. The fees and charges for services could include a myriad of items such as water treatment rates, sewer treatment rates, impact fees etc. A portion of these fees and charges could be used for the operation and maintenance costs of the Project. A tax sharing arrangement would need to be worked out with the newly formed CSD to flow some or all of this money to the project.

Tribal Gaming Revenues

While we understand that any gaming revenues are the jurisdiction of the Bureau of Indian Affairs and the State of California, it would be the desire of the Authority to seek participation by the local tribes. They will directly benefit from any recreational or gaming activities and we would hope to garner cooperation with many of the tribes that have lands adjacent to the Sea.

Government Grants and Loans

The Authority is seeking grants and loans from the Federal Government and the State of California. It is anticipated that most of this money would be used for direct project costs. We are looking more to the local funding sources for the annual operation and maintenance costs of our Project. However, some additional government money may be available to offset some of these costs.

Research Institutes

It has been suggested that the Authority try to attract various research institutes. A restored Salton Sea could offer a vast array of research possibilities and would allow the Authority to gain some potential grants and loans associated with such research. We could also generate some direct research fees such as licensing fees from these various institutes. No partners have been identified to date but some parties have expressed an interest in this type of program.

RECREATIONAL FEES

It has also been suggested that the Authority pursue some locally generated fees directly tied to the recreational activities that come from a restored Salton Sea.

Boating Tag

The Authority could charge for an annual boating tag fee that could go to offset some ongoing operation and maintenance of the Project.

State Park Fees

This would require negotiation with the State of California. It has been suggested that the State of California would charge a park fee much like it does for the various other state parks. A surcharge could be added to the fee allowing for the Authority to generate some additional funds for operation and maintenance of the Project.

Four-Wheel Drive and Recreational Vehicle Fees

It has come to our attention that several 4WD groups have annual events at the Salton Sea with participation in the thousands. This untapped wilderness is ideal for such outings and could be combined with a state park fee or other license fees. In addition, it has come to our attention that many recreational vehicle folks actually store their vehicles in the Coachella and Imperial Valleys where they can fly in and then bring their vehicle to the Sea for recreational activities.

Airport

The City of Salton City has a small unimproved private airport. The Authority could approach the Aircraft Owners and Pilots Association "AOPA" to help lobby in seeking funding to build a regional or local public airport to attract private pilots from around the country to participate in the various recreational activities. In addition, the Salton Sea is directly adjacent, on the South side, to the Jacqueline Cochran Regional Airport commonly known as KTRM. This airport has two runways with one exceeding 8,500 ft. This fully improved airport that already has several Fixed Based Operators (FBOs) could eventually be established as a regional air transportation facility serving the Salton Sea recreational area.

THE POWER OF LOCAL FUNDING SOURCES (EXAMPLES)

It has been estimated that a restored Salton Sea could promote the development of 100,000 to 250,000 residential units in the vicinity. This memo does not purport to do any projection of new development but rather demonstrates the potential dollar impacts of local funding mechanisms, particularly the Infrastructure Financing District and Community Facilities District related to such development. The tables below, and the attached schedules in Appendix A-1, A-2 and Appendix B-1, B-2, demonstrate the enormous capacity from local funding sources that the Authority can bring to the table to potentially offset the ongoing operation and maintenance.

The table below illustrates the potential revenue for operations and maintenance generated by adding 2,000 new single-family residential units each year over the 50-year life of the IFD (Total Homes = 100,000). (See Appendix A-1 and A-2)

The table also illustrates how the addition of the same 2,000 units of single-family residential development can fund operations and maintenance through the use of the CFD mechanism. (See Appendix B-1 and B-2)

Funding Source	Annual Revenue	Total Revenue
IFD (1)	$5.3MM - $444.0MM	$9.52BB
IFD (2)	$10.6MM - $888.0MM	$19.05BB
CFD (1)	$3.4MM – $287.2MM	$6.15BB
CFD (2)	$6.8MM - $574.4MM	$12.3BB

Notes
(1) Assumes 2,000 Units Added/Year for 50 Years (Total = 100,000 Units)
(2) Assumes 4,000 Units Added/Year for 50 Years (Total = 200,000 Units) Net of In-Tract

Some CFD capacity (we assumed ½ already netted from the above numbers) would be used for in-tract improvements (sewers, sidewalks, schools, fire / police protection, etc.) through the issuance of bonds.

The table below shows the potential bonding capacity and net project proceeds available through the two mechanisms should the Authority choose to issue bonds for project construction or expansion instead of operation and maintenance:

Financing Source	Bond Amount	Net Proceeds (3)
IFD (1)	$3,961,484,091	$3,486,106,000
IFD (2)	$7.922,968,182	$6,972,212,000
CFD (1)	$2,550,777,443	$2,244,684,150
CFD (2)	$5,101,554,887	$4,489,368,300

Notes
(1) Assumes 2,000 Units Added/Year for 50 Years (Total = 100,000 Units)
(2) Assumes 4,000 Units Added/Year for 50 Years (Total = 200,000 Units) Net of In-Tract
(3) Represents the Net Amount of Bond Proceeds after Funding Reserve Funds and Paying the Costs of the Financing

This memo describes the benefit of economic development to the Project. The numbers become very significant very fast. The problem faced by the Authority is that, much like the line from the movie Field of Dreams "if you build it they will come", we need help from Federal and State sources or some combination thereof to help finance the upfront costs of the Project. However, we feel confident that, through the use of the local funding sources, the Authority and the member agencies can offset the annual operation and maintenance costs of the Project.

CONCLUSIONS

The Authority has generated a great deal of member, local agency and general public support for our plan to restore the Salton Sea. While many of the other alternatives may cost less, they have environmental impacts that could be potentially negative by their very nature. Our plan can be environmentally positive and provide not only wildlife habitat but a myriad of recreational opportunities. In addition, it does not appear that any of the other plans have a local funding component. While none of the proposed local options can pay for the entire cost of any Project they can pay for most or all of the operation and maintenance of the contemplated facilities.

While many of the other local and state fee alternatives would help to offset some of the annual operation and maintenance costs of the Project, the IFD mechanism offers the most promise and most available direct money for ongoing operation and maintenance dollars. Secondarily, the CFD mechanism may provide for a certain amount of backup funding either for ongoing operation and maintenance dollars or in-tract infrastructure. In addition the Authority, in cooperation with the Member Agencies, will work together to utilize any of the other funding alternatives that the Authority cannot do independently.

Any special legislation will incorporate provisions that will allow the Authority to benefit directly from the IFD and CFD funding mechanisms. In addition, through the help and cooperation of our local Member Agencies, we will use all other local funding alternatives available to the Authority and Member Agencies to further our goal of restoration of the Salton Sea. This includes revitalization of wildlife habitat, heading off an environmental disaster while enhancing the recreational opportunities to Californians.

Sources

(1) Portions Excerpted from Memo Dated April 7th 2004 by Best Best &Krieger LLP
(2) Portions Excerpted from Memo Dated September 19th 2005 by Best Best &Krieger LLP

Appendix A

Salton Sea Authority
Infrastructure Financing District
Tax Allocation Bond Financing Model

Tax Increment Growth Rate	**2.00%**
Debt Service Coverage Ratio	**1.200**
Present Value Rate	**5.00%**
Gross Tax Rate	**1.00%**
Net Amount After Pass-Thrus	**75.00%**

Base Year AV	-
Residential Units	**100,000**
AV Per Unit	**350,000**

				Par Amount	**67,254,473**	**68,599,563**	**69,971,554**	**71,370,985**	**72,798,405**	**74,254,373**	**75,739,460**	**77,254,249**	**78,799,334**	**80,375,321**	**81,982,828**	**83,622,484**
				Net Proceeds	**61,534,384**	**62,765,071**	**64,020,373**	**65,300,780**	**66,606,796**	**67,938,932**	**69,297,711**	**70,683,665**	**72,097,338**	**73,539,285**	**75,010,070**	**76,510,272**
Year	**Beginning Incremental AV**	**Residential Units Added**	**Ending Incremental AV**	**Total Net Tax Inc. Avail For DS (1)**	**Less: DS Series 1**	**Less: DS Series 2**	**Less: DS Series 3**	**Less: DS Series 4**	**Less: DS Series 5**	**Less: DS Series 6**	**Less: DS Series 7**	**Less: DS Series 8**	**Less: DS Series 9**	**Less: DS Series 10**	**Less: DS Series 11**	**Less: DS Series 12**
1	-	2,000	700,000,000	5,250,000												
2	700,000,000	2,000	1,414,000,000	10,605,000	(4,375,000)											
3	1,414,000,000	2,000	2,142,280,000	16,067,100	(4,375,000)	(4,462,500)										
4	2,142,280,000	2,000	2,885,125,600	21,638,442	(4,375,000)	(4,462,500)	(4,551,750)									
5	2,885,125,600	2,000	3,642,828,112	27,321,211	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)								
6	3,642,828,112	2,000	4,415,684,674	33,117,635	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)							
7	4,415,684,674	2,000	5,203,998,368	39,029,988	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)						
8	5,203,998,368	2,000	6,008,078,335	45,060,588	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)					
9	6,008,078,335	2,000	6,828,239,902	51,211,799	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)				
10	6,828,239,902	2,000	7,664,804,700	57,486,035	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)			
11	7,664,804,700	2,000	8,518,100,794	63,885,756	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)		
12	8,518,100,794	2,000	9,388,462,810	70,413,471	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	
13	9,388,462,810	2,000	10,276,232,066	77,071,740	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
14	10,276,232,066	2,000	11,181,756,707	83,863,175	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
15	11,181,756,707	2,000	12,105,391,841	90,790,439	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
16	12,105,391,841	2,000	13,047,499,678	97,856,248	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
17	13,047,499,678	2,000	14,008,449,672	105,063,373	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
18	14,008,449,672	2,000	14,988,618,665	112,414,640	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
19	14,988,618,665	2,000	15,988,391,038	119,912,933	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
20	15,988,391,038	2,000	17,008,158,859	127,561,191	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
21	17,008,158,859	2,000	18,048,322,036	135,362,415	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
22	18,048,322,036	2,000	19,109,288,477	143,319,664	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
23	19,109,288,477	2,000	20,191,474,247	151,436,057	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
24	20,191,474,247	2,000	21,295,303,732	159,714,778	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
25	21,295,303,732	2,000	22,421,209,806	168,159,074	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
26	22,421,209,806	2,000	23,569,634,002	176,772,255	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
27	23,569,634,002	2,000	24,741,026,682	185,557,700	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
28	24,741,026,682	2,000	25,935,847,216	194,518,854	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
29	25,935,847,216	2,000	27,154,564,160	203,659,231	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
30	27,154,564,160	2,000	28,397,655,444	212,982,416	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
31	28,397,655,444	2,000	29,665,608,552	222,492,064	(4,375,000)	(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
32	29,665,608,552	2,000	30,958,920,724	232,191,905		(4,462,500)	(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
33	30,958,920,724	2,000	32,278,099,138	242,085,744			(4,551,750)	(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
34	32,278,099,138	2,000	33,623,661,121	252,177,458				(4,642,785)	(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
35	33,623,661,121	2,000	34,996,134,343	262,471,008					(4,735,641)	(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
36	34,996,134,343	2,000	36,396,057,030	272,970,428						(4,830,354)	(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
37	36,396,057,030	2,000	37,823,978,171	283,679,836							(4,926,961)	(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
38	37,823,978,171	2,000	39,280,457,734	294,603,433								(5,025,500)	(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
39	39,280,457,734	2,000	40,766,066,889	305,745,502									(5,126,010)	(5,228,530)	(5,333,101)	(5,439,763)
40	40,766,066,889	2,000	42,281,388,227	317,110,412										(5,228,530)	(5,333,101)	(5,439,763)
41	42,281,388,227	2,000	43,827,015,991	328,702,620											(5,333,101)	(5,439,763)
42	43,827,015,991	2,000	45,403,556,311	340,526,672												(5,439,763)
43	45,403,556,311	2,000	47,011,627,437	352,587,206												
44	47,011,627,437	2,000	48,651,859,986	364,888,950												
45	48,651,859,986	2,000	50,324,897,186	377,436,729												
46	50,324,897,186	2,000	52,031,395,129	390,235,463												
47	52,031,395,129	2,000	53,772,023,032	403,290,173												
48	53,772,023,032	2,000	55,547,463,492	416,605,976												
49	55,547,463,492	2,000	57,358,412,762	430,188,096												
50	57,358,412,762	2,000	59,205,581,018	444,041,858												
Totals	**1,210,279,050,879**	**100,000**	**1,269,484,631,896**	**9,521,134,739**	**(131,250,000)**	**(133,875,000)**	**(136,552,500)**	**(139,283,550)**	**(142,069,221)**	**(144,910,605)**	**(147,808,818)**	**(150,764,994)**	**(153,780,294)**	**(156,855,900)**	**(159,993,018)**	**(163,192,878)**

Notes
(1) Net of Pass-Thrus to Local Taxing Agencies

Appendix A

Salton Sea Authority
Infrastructure Financing District
Tax Allocation Bond Financing Model

Tax Increment Growth Rate	**2.00%**
Debt Service Coverage Ratio	**1.200**
Present Value Rate	**5.00%**
Gross Tax Rate	**1.00%**
Net Amount After Pass-Thrus	**75.00%**

Base Year AV	**-**
Residential Units	**100,000**
AV Per Unit	**350,000**

				Par Amount	**85,294,934**	**87,000,833**	**88,740,849**	**90,515,666**	**92,325,979**	**94,172,499**	**96,055,949**	**97,977,068**	**98,432,420**	**98,790,082**	**99,040,516**	**99,173,459**
				Net Proceeds	**78,040,477**	**79,601,287**	**81,193,313**	**82,817,179**	**84,473,522**	**86,162,993**	**87,886,253**	**89,643,978**	**89,962,752**	**90,183,240**	**90,296,045**	**90,291,055**
Year	**Beginning Incremental AV**	**Residential Units Added**	**Ending Incremental AV**	**Total Net Tax Inc. Avail For DS (1)**	**Less: DS Series 13**	**Less: DS Series 14**	**Less: DS Series 15**	**Less: DS Series 16**	**Less: DS Series 17**	**Less: DS Series 18**	**Less: DS Series 19**	**Less: DS Series 20**	**Less: DS Series 21**	**Less: DS Series 22**	**Less: DS Series 23**	**Less: DS Series 24**
1	-	2,000	700,000,000	5,250,000												
2	700,000,000	2,000	1,414,000,000	10,605,000												
3	1,414,000,000	2,000	2,142,280,000	16,067,100												
4	2,142,280,000	2,000	2,885,125,600	21,638,442												
5	2,885,125,600	2,000	3,642,828,112	27,321,211												
6	3,642,828,112	2,000	4,415,684,674	33,117,635												
7	4,415,684,674	2,000	5,203,998,368	39,029,988												
8	5,203,998,368	2,000	6,008,078,335	45,060,588												
9	6,008,078,335	2,000	6,828,239,902	51,211,799												
10	6,828,239,902	2,000	7,664,804,700	57,486,035												
11	7,664,804,700	2,000	8,518,100,794	63,885,756												
12	8,518,100,794	2,000	9,388,462,810	70,413,471												
13	9,388,462,810	2,000	10,276,232,066	77,071,740												
14	10,276,232,066	2,000	11,181,756,707	83,863,175	(5,548,558)											
15	11,181,756,707	2,000	12,105,391,841	90,790,439	(5,548,558)	(5,659,529)										
16	12,105,391,841	2,000	13,047,499,678	97,856,248	(5,548,558)	(5,659,529)	(5,772,720)									
17	13,047,499,678	2,000	14,008,449,672	105,063,373	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)								
18	14,008,449,672	2,000	14,988,618,665	112,414,640	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)							
19	14,988,618,665	2,000	15,988,391,038	119,912,933	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)						
20	15,988,391,038	2,000	17,008,158,859	127,561,191	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)					
21	17,008,158,859	2,000	18,048,322,036	135,362,415	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)				
22	18,048,322,036	2,000	19,109,288,477	143,319,664	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)			
23	19,109,288,477	2,000	20,191,474,247	151,436,057	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)		
24	20,191,474,247	2,000	21,295,303,732	159,714,778	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	
25	21,295,303,732	2,000	22,421,209,806	168,159,074	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
26	22,421,209,806	2,000	23,569,634,002	176,772,255	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
27	23,569,634,002	2,000	24,741,026,682	185,557,700	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
28	24,741,026,682	2,000	25,935,847,216	194,518,854	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
29	25,935,847,216	2,000	27,154,564,160	203,659,231	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
30	27,154,564,160	2,000	28,397,655,444	212,982,416	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
31	28,397,655,444	2,000	29,665,608,552	222,492,064	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
32	29,665,608,552	2,000	30,958,920,724	232,191,905	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
33	30,958,920,724	2,000	32,278,099,138	242,085,744	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
34	32,278,099,138	2,000	33,623,661,121	252,177,458	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
35	33,623,661,121	2,000	34,996,134,343	262,471,008	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
36	34,996,134,343	2,000	36,396,057,030	272,970,428	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
37	36,396,057,030	2,000	37,823,978,171	283,679,836	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
38	37,823,978,171	2,000	39,280,457,734	294,603,433	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
39	39,280,457,734	2,000	40,766,066,889	305,745,502	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
40	40,766,066,889	2,000	42,281,388,227	317,110,412	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
41	42,281,388,227	2,000	43,827,015,991	328,702,620	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
42	43,827,015,991	2,000	45,403,556,311	340,526,672	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
43	45,403,556,311	2,000	47,011,627,437	352,587,206	(5,548,558)	(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
44	47,011,627,437	2,000	48,651,859,986	364,888,950		(5,659,529)	(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
45	48,651,859,986	2,000	50,324,897,186	377,436,729			(5,772,720)	(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
46	50,324,897,186	2,000	52,031,395,129	390,235,463				(5,888,174)	(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
47	52,031,395,129	2,000	53,772,023,032	403,290,173					(6,005,937)	(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
48	53,772,023,032	2,000	55,547,463,492	416,605,976						(6,126,056)	(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
49	55,547,463,492	2,000	57,358,412,762	430,188,096							(6,248,577)	(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
50	57,358,412,762	2,000	59,205,581,018	444,041,858								(6,373,549)	(6,501,020)	(6,631,040)	(6,763,661)	(6,898,934)
Totals	**1,210,279,050,879**	**100,000**	**1,269,484,631,896**	**9,521,134,739**	**(166,456,736)**	**(169,785,870)**	**(173,181,588)**	**(176,645,219)**	**(180,178,124)**	**(183,781,686)**	**(187,457,320)**	**(191,206,466)**	**(188,529,576)**	**(185,669,127)**	**(182,618,849)**	**(179,372,291)**

Notes
(1) Net of Pass-Thrus to Local Taxing Agencies

Appendix A

Salton Sea Authority
Infrastructure Financing District
Tax Allocation Bond Financing Model

Tax Increment Growth Rate	**2.00%**
Debt Service Coverage Ratio	**1.200**
Present Value Rate	**5.00%**
Gross Tax Rate	**1.00%**
Net Amount After Pass-Thrus	**75.00%**

Base Year AV	-
Residential Units	**100,000**
AV Per Unit	**350,000**

				Par Amount	**99,177,861**	**99,041,838**	**98,752,604**	**98,296,411**	**97,658,475**	**96,822,907**	**148,645,905**	**146,654,063**	**144,269,886**	**141,460,501**	**138,190,598**	**134,422,260**
				Net Proceeds	**90,157,391**	**89,883,350**	**89,456,348**	**88,862,854**	**88,088,325**	**87,117,128**	**133,373,280**	**131,175,281**	**128,587,873**	**125,578,743**	**122,113,188**	**118,153,945**
Year	**Beginning Incremental AV**	**Residential Units Added**	**Ending Incremental AV**	**Total Net Tax Inc. Avail For DS (1)**	**Less: DS Series 25**	**Less: DS Series 26**	**Less: DS Series 27**	**Less: DS Series 28**	**Less: DS Series 29**	**Less: DS Series 30**	**Less: DS Series 31**	**Less: DS Series 32**	**Less: DS Series 33**	**Less: DS Series 34**	**Less: DS Series 35**	**Less: DS Series 36**
1	-	2,000	700,000,000	5,250,000												
2	700,000,000	2,000	1,414,000,000	10,605,000												
3	1,414,000,000	2,000	2,142,280,000	16,067,100												
4	2,142,280,000	2,000	2,885,125,600	21,638,442												
5	2,885,125,600	2,000	3,642,828,112	27,321,211												
6	3,642,828,112	2,000	4,415,684,674	33,117,635												
7	4,415,684,674	2,000	5,203,998,368	39,029,988												
8	5,203,998,368	2,000	6,008,078,335	45,060,588												
9	6,008,078,335	2,000	6,828,239,902	51,211,799												
10	6,828,239,902	2,000	7,664,804,700	57,486,035												
11	7,664,804,700	2,000	8,518,100,794	63,885,756												
12	8,518,100,794	2,000	9,388,462,810	70,413,471												
13	9,388,462,810	2,000	10,276,232,066	77,071,740												
14	10,276,232,066	2,000	11,181,756,707	83,863,175												
15	11,181,756,707	2,000	12,105,391,841	90,790,439												
16	12,105,391,841	2,000	13,047,499,678	97,856,248												
17	13,047,499,678	2,000	14,008,449,672	105,063,373												
18	14,008,449,672	2,000	14,988,618,665	112,414,640												
19	14,988,618,665	2,000	15,988,391,038	119,912,933												
20	15,988,391,038	2,000	17,008,158,859	127,561,191												
21	17,008,158,859	2,000	18,048,322,036	135,362,415												
22	18,048,322,036	2,000	19,109,288,477	143,319,664												
23	19,109,288,477	2,000	20,191,474,247	151,436,057												
24	20,191,474,247	2,000	21,295,303,732	159,714,778												
25	21,295,303,732	2,000	22,421,209,806	168,159,074												
26	22,421,209,806	2,000	23,569,634,002	176,772,255	(7,036,913)											
27	23,569,634,002	2,000	24,741,026,682	185,557,700	(7,036,913)	(7,177,651)										
28	24,741,026,682	2,000	25,935,847,216	194,518,854	(7,036,913)	(7,177,651)	(7,321,204)									
29	25,935,847,216	2,000	27,154,564,160	203,659,231	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)								
30	27,154,564,160	2,000	28,397,655,444	212,982,416	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)							
31	28,397,655,444	2,000	29,665,608,552	222,492,064	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)						
32	29,665,608,552	2,000	30,958,920,724	232,191,905	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)					
33	30,958,920,724	2,000	32,278,099,138	242,085,744	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)				
34	32,278,099,138	2,000	33,623,661,121	252,177,458	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)	(12,796,615)			
35	33,623,661,121	2,000	34,996,134,343	262,471,008	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)	(12,796,615)	(13,052,547)		
36	34,996,134,343	2,000	36,396,057,030	272,970,428	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)	(12,796,615)	(13,052,547)	(13,313,598)	
37	36,396,057,030	2,000	37,823,978,171	283,679,836	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)	(12,796,615)	(13,052,547)	(13,313,598)	(13,579,870)
38	37,823,978,171	2,000	39,280,457,734	294,603,433	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)	(12,796,615)	(13,052,547)	(13,313,598)	(13,579,870)
39	39,280,457,734	2,000	40,766,066,889	305,745,502	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)	(12,796,615)	(13,052,547)	(13,313,598)	(13,579,870)
40	40,766,066,889	2,000	42,281,388,227	317,110,412	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)	(12,796,615)	(13,052,547)	(13,313,598)	(13,579,870)
41	42,281,388,227	2,000	43,827,015,991	328,702,620	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)	(12,796,615)	(13,052,547)	(13,313,598)	(13,579,870)
42	43,827,015,991	2,000	45,403,556,311	340,526,672	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)	(12,796,615)	(13,052,547)	(13,313,598)	(13,579,870)
43	45,403,556,311	2,000	47,011,627,437	352,587,206	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)	(12,796,615)	(13,052,547)	(13,313,598)	(13,579,870)
44	47,011,627,437	2,000	48,651,859,986	364,888,950	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)	(12,796,615)	(13,052,547)	(13,313,598)	(13,579,870)
45	48,651,859,986	2,000	50,324,897,186	377,436,729	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)	(12,796,615)	(13,052,547)	(13,313,598)	(13,579,870)
46	50,324,897,186	2,000	52,031,395,129	390,235,463	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)	(12,796,615)	(13,052,547)	(13,313,598)	(13,579,870)
47	52,031,395,129	2,000	53,772,023,032	403,290,173	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)	(12,796,615)	(13,052,547)	(13,313,598)	(13,579,870)
48	53,772,023,032	2,000	55,547,463,492	416,605,976	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)	(12,796,615)	(13,052,547)	(13,313,598)	(13,579,870)
49	55,547,463,492	2,000	57,358,412,762	430,188,096	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)	(12,796,615)	(13,052,547)	(13,313,598)	(13,579,870)
50	57,358,412,762	2,000	59,205,581,018	444,041,858	(7,036,913)	(7,177,651)	(7,321,204)	(7,467,628)	(7,616,981)	(7,769,321)	(12,299,707)	(12,545,701)	(12,796,615)	(13,052,547)	(13,313,598)	(13,579,870)
Totals	**1,210,279,050,879**	**100,000**	**1,269,484,631,896**	**9,521,134,739**	**(175,922,824)**	**(172,263,629)**	**(168,387,698)**	**(164,287,823)**	**(159,956,599)**	**(155,386,410)**	**(233,694,432)**	**(225,822,619)**	**(217,542,457)**	**(208,840,758)**	**(199,703,975)**	**(190,118,184)**

Notes
(1) Net of Pass-Thrus to Local Taxing Agencies

Appendix A

Salton Sea Authority
Infrastructure Financing District
Tax Allocation Bond Financing Model

Tax Increment Growth Rate	**2.00%**
Debt Service Coverage Ratio	**1.200**
Present Value Rate	**5.00%**
Gross Tax Rate	**1.00%**
Net Amount After Pass-Thrus	**75.00%**

Par Amount	**130,114,773**	**125,224,425**	**119,704,292**	**113,504,008**	**3,961,484,091**		
Net Proceeds	**113,661,010**	**108,591,439**	**102,899,139**	**96,534,640**	**3,570,090,703**		

Base Year AV	**-**
Residential Units	**100,000**
AV Per Unit	**350,000**

Year	Beginning Incremental AV	Residential Units Added	Ending Incremental AV	Total Net Tax Inc. Avail For DS (1)	Less: DS Series 37	Less: DS Series 38	Less: DS Series 39	Less: DS Series 40	Total DS	Total Net Tax Inc. After DS	Annual Coverage
1	-	2,000	700,000,000	5,250,000					-	5,250,000	N/A
2	700,000,000	2,000	1,414,000,000	10,605,000					(4,375,000)	6,230,000	1.200
3	1,414,000,000	2,000	2,142,280,000	16,067,100					(8,837,500)	7,229,600	1.200
4	2,142,280,000	2,000	2,885,125,600	21,638,442					(13,389,250)	8,249,192	1.200
5	2,885,125,600	2,000	3,642,828,112	27,321,211					(18,032,035)	9,289,176	1.200
6	3,642,828,112	2,000	4,415,684,674	33,117,635					(22,767,676)	10,349,959	1.200
7	4,415,684,674	2,000	5,203,998,368	39,029,988					(27,598,029)	11,431,959	1.200
8	5,203,998,368	2,000	6,008,078,335	45,060,588					(32,524,990)	12,535,598	1.200
9	6,008,078,335	2,000	6,828,239,902	51,211,799					(37,550,490)	13,661,310	1.200
10	6,828,239,902	2,000	7,664,804,700	57,486,035					(42,676,499)	14,809,536	1.200
11	7,664,804,700	2,000	8,518,100,794	63,885,756					(47,905,029)	15,980,727	1.200
12	8,518,100,794	2,000	9,388,462,810	70,413,471					(53,238,130)	17,175,341	1.200
13	9,388,462,810	2,000	10,276,232,066	77,071,740					(58,677,893)	18,393,848	1.200
14	10,276,232,066	2,000	11,181,756,707	83,863,175					(64,226,450)	19,636,725	1.200
15	11,181,756,707	2,000	12,105,391,841	90,790,439					(69,885,979)	20,904,459	1.200
16	12,105,391,841	2,000	13,047,499,678	97,856,248					(75,658,699)	22,197,549	1.200
17	13,047,499,678	2,000	14,008,449,672	105,063,373					(81,546,873)	23,516,500	1.200
18	14,008,449,672	2,000	14,988,618,665	112,414,640					(87,552,810)	24,861,830	1.200
19	14,988,618,665	2,000	15,988,391,038	119,912,933					(93,678,867)	26,234,066	1.200
20	15,988,391,038	2,000	17,008,158,859	127,561,191					(99,927,444)	27,633,747	1.200
21	17,008,158,859	2,000	18,048,322,036	135,362,415					(106,300,993)	29,061,422	1.200
22	18,048,322,036	2,000	19,109,288,477	143,319,664					(112,802,013)	30,517,651	1.200
23	19,109,288,477	2,000	20,191,474,247	151,436,057					(119,433,053)	32,003,004	1.200
24	20,191,474,247	2,000	21,295,303,732	159,714,778					(126,196,714)	33,518,064	1.200
25	21,295,303,732	2,000	22,421,209,806	168,159,074					(133,095,648)	35,063,425	1.200
26	22,421,209,806	2,000	23,569,634,002	176,772,255					(140,132,561)	36,639,694	1.200
27	23,569,634,002	2,000	24,741,026,682	185,557,700					(147,310,213)	38,247,488	1.200
28	24,741,026,682	2,000	25,935,847,216	194,518,854					(154,631,417)	39,887,437	1.200
29	25,935,847,216	2,000	27,154,564,160	203,659,231					(162,099,045)	41,560,186	1.200
30	27,154,564,160	2,000	28,397,655,444	212,982,416					(169,716,026)	43,266,390	1.200
31	28,397,655,444	2,000	29,665,608,552	222,492,064					(177,485,347)	45,006,718	1.200
32	29,665,608,552	2,000	30,958,920,724	232,191,905					(185,410,053)	46,781,852	1.200
33	30,958,920,724	2,000	32,278,099,138	242,085,744					(193,493,255)	48,592,489	1.200
34	32,278,099,138	2,000	33,623,661,121	252,177,458					(201,738,120)	50,439,339	1.200
35	33,623,661,121	2,000	34,996,134,343	262,471,008					(210,147,882)	52,323,126	1.200
36	34,996,134,343	2,000	36,396,057,030	272,970,428					(218,725,840)	54,244,588	1.200
37	36,396,057,030	2,000	37,823,978,171	283,679,836					(227,475,356)	56,204,480	1.200
38	37,823,978,171	2,000	39,280,457,734	294,603,433	(13,851,468)				(236,399,864)	58,203,569	1.200
39	39,280,457,734	2,000	40,766,066,889	305,745,502	(13,851,468)	(14,128,497)			(245,502,861)	60,242,641	1.200
40	40,766,066,889	2,000	42,281,388,227	317,110,412	(13,851,468)	(14,128,497)	(14,411,067)		(254,787,918)	62,322,494	1.200
41	42,281,388,227	2,000	43,827,015,991	328,702,620	(13,851,468)	(14,128,497)	(14,411,067)	(14,699,288)	(264,258,676)	64,443,944	1.200
42	43,827,015,991	2,000	45,403,556,311	340,526,672	(13,851,468)	(14,128,497)	(14,411,067)	(14,699,288)	(258,925,576)	81,601,097	1.269
43	45,403,556,311	2,000	47,011,627,437	352,587,206	(13,851,468)	(14,128,497)	(14,411,067)	(14,699,288)	(253,485,813)	99,101,393	1.343
44	47,011,627,437	2,000	48,651,859,986	364,888,950	(13,851,468)	(14,128,497)	(14,411,067)	(14,699,288)	(247,937,255)	116,951,695	1.422
45	48,651,859,986	2,000	50,324,897,186	377,436,729	(13,851,468)	(14,128,497)	(14,411,067)	(14,699,288)	(242,277,726)	135,159,003	1.506
46	50,324,897,186	2,000	52,031,395,129	390,235,463	(13,851,468)	(14,128,497)	(14,411,067)	(14,699,288)	(236,505,007)	153,730,457	1.596
47	52,031,395,129	2,000	53,772,023,032	403,290,173	(13,851,468)	(14,128,497)	(14,411,067)	(14,699,288)	(230,616,833)	172,673,340	1.692
48	53,772,023,032	2,000	55,547,463,492	416,605,976	(13,851,468)	(14,128,497)	(14,411,067)	(14,699,288)	(224,610,895)	191,995,081	1.796
49	55,547,463,492	2,000	57,358,412,762	430,188,096	(13,851,468)	(14,128,497)	(14,411,067)	(14,699,288)	(218,484,839)	211,703,257	1.907
50	57,358,412,762	2,000	59,205,581,018	444,041,858	(13,851,468)	(14,128,497)	(14,411,067)	(14,699,288)	(212,236,262)	231,805,596	2.027
Totals	**1,210,279,050,879**	**100,000**	**1,269,484,631,896**	**9,521,134,739**	**(180,069,080)**	**(169,541,965)**	**(158,521,737)**	**(146,992,883)**	**(6,852,272,704)**	**2,668,862,035**	

Notes
(1) Net of Pass-Thrus to Local Taxing Agencies

Appendix B

Salton Sea Authority
CFD No. XXXX-XX (Development Name)
Special Tax Bonds, Series XXXX

Debt Service Coverage Calculation and Estimated Annual CFD Cash Flow

Year	Maximum Special Tax Revenue (1)	Annual Debt Service (2)	Less: Capitalized Interest (3)	Net Annual Debt Service (4)	Gross Annual Coverage	Plus: Annual Auth. Admin Fee (5)	Less: RF Earnings + Corpus (6)	Net Total Annual CFD Costs	Net Annual Coverage
1	7,000,000	4,772,625	(4,772,625)	-	N/A	98,316	(323,302)	(224,986)	N/A
2	7,140,000	6,488,500	-	6,488,500	1.100	137,673	(431,070)	6,195,103	
3	7,282,800	6,616,625	-	6,616,625	1.101	144,603	(431,070)	6,330,159	
4	7,428,456	6,752,325	-	6,752,325	1.100	151,996	(431,070)	6,473,251	
5	7,577,025	6,884,775	-	6,884,775	1.101	159,627	(431,070)	6,613,332	
6	7,728,566	7,023,700	-	7,023,700	1.100	167,733	(431,070)	6,760,364	
7	7,883,137	7,163,275	-	7,163,275	1.100	176,198	(431,070)	6,908,404	
8	8,040,800	7,307,950	-	7,307,950	1.100	185,150	(431,070)	7,062,030	
9	8,201,616	7,451,900	-	7,451,900	1.101	194,461	(431,070)	7,215,291	
10	8,365,648	7,604,575	-	7,604,575	1.100	204,398	(431,070)	7,377,903	
11	8,532,961	7,754,875	-	7,754,875	1.100	214,691	(431,070)	7,538,496	
12	8,703,620	7,907,250	-	7,907,250	1.101	225,477	(431,070)	7,701,657	
13	8,877,693	8,065,875	-	8,065,875	1.101	236,900	(431,070)	7,871,705	
14	9,055,246	8,229,650	-	8,229,650	1.100	248,962	(431,070)	8,047,542	
15	9,236,351	8,392,475	-	8,392,475	1.101	261,504	(431,070)	8,222,909	
16	9,421,078	8,563,525	-	8,563,525	1.100	274,839	(431,070)	8,407,294	
17	9,609,500	8,731,425	-	8,731,425	1.101	288,634	(431,070)	8,588,990	
18	9,801,690	8,910,350	-	8,910,350	1.100	303,385	(431,070)	8,782,666	
19	9,997,724	9,083,650	-	9,083,650	1.101	318,565	(431,070)	8,971,145	
20	10,197,678	9,270,500	-	9,270,500	1.100	334,871	(431,070)	9,174,301	
21	10,401,632	9,453,975	-	9,453,975	1.100	351,744	(431,070)	9,374,649	
22	10,609,664	9,642,975	-	9,642,975	1.100	369,539	(431,070)	9,581,444	
23	10,821,858	9,835,850	-	9,835,850	1.100	388,238	(431,070)	9,793,018	
24	11,038,295	10,030,950	-	10,030,950	1.100	407,817	(431,070)	10,007,697	
25	11,259,061	10,231,625	-	10,231,625	1.100	428,455	(431,070)	10,229,010	
26	11,484,242	10,435,950	-	10,435,950	1.100	450,122	(431,070)	10,455,002	
27	11,713,927	10,647,000	-	10,647,000	1.100	473,001	(431,070)	10,688,931	
28	11,948,205	10,857,575	-	10,857,575	1.100	496,827	(431,070)	10,923,332	
29	12,187,169	11,075,750	-	11,075,750	1.100	522,015	(431,070)	11,166,695	
30	12,430,913	11,299,050	-	11,299,050	1.100	548,515	(11,207,815)	639,751	1
Totals	**283,976,554**	**256,486,525**	**(4,772,625)**	**251,713,900**		**8,764,256**	**(23,601,071)**	**236,877,085**	

Notes

(1) Assumes 2,000 Unit Residential Development ($350,000/Unit Cost, 2.00% Total Tax Rate (1% Net of General Levy), Special Taxes Grow at 2.00%/Year)
(2) Total Annual Principal and Interest
(3) Interest Capitalized Through and Including One Year
(4) Debt Service Net of Capitalized Interest
(5) Assumed to be 2.00% of Annual Debt Service with 3.00% Annual Inflation
(6) Estimated Reserve Fund Interest Earnings at 4.00%

Salton Sea Authority
Tax Allocation Revenue Bonds, Series 2006
Solana Beach Redevelopment Project

Debt Service Capacity Model (AV Base of Zero, Projection of New Development and AV Growth at Model Assumed Rate)

Tax Increment Growth Rate	2.00%
Debt Service Coverage Ratio	1.200
Present Value Rate	5.00%
Gross Tax Rate	1.00%
Net Amount After Housing and Pass-Thrus	60.00%

Base Year AV	-
Residential Units	1,000
AV Per Unit	250,000

				Par Amount	3,843,113	3,919,975	3,998,375	4,078,342	4,159,909	399,994	407,994	416,154	424,477	432,967	441,626	450,459	459,468
				Net Proceeds	3,393,469	3,461,338	3,530,565	3,601,176	3,673,200	353,195	360,259	367,464	374,813	382,310	389,956	397,755	405,710
Year	Beginning Incremental AV	Residential Units Added	Ending Incremental AV	Total Net Tax Inc. Avail For DS (1)	Less: DS Series 1	Less: DS Series 2	Less: DS Series 3	Less: DS Series 4	Less: DS Series 5	Less: DS Series 6	Less: DS Series 7	Less: DS Series 8	Less: DS Series 9	Less: DS Series 10	Less: DS Series 11	Less: DS Series 12	Less: DS Series 13
1	-	200	50,000,000	300,000													
2	50,000,000	200	101,000,000	606,000	(250,000)												
3	101,000,000	200	153,020,000	918,120	(250,000)	(255,000)											
4	153,020,000	200	206,080,400	1,236,482	(250,000)	(255,000)	(260,100)										
5	206,080,400	200	260,202,008	1,561,212	(250,000)	(255,000)	(260,100)	(265,302)									
6	260,202,008	-	265,406,048	1,592,436	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)								
7	265,406,048	-	270,714,169	1,624,285	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)							
8	270,714,169	-	276,128,453	1,656,771	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)						
9	276,128,453	-	281,651,022	1,689,906	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)					
10	281,651,022	-	287,284,042	1,723,704	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)				
11	287,284,042	-	293,029,723	1,758,178	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)			
12	293,029,723	-	298,890,317	1,793,342	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)		
13	298,890,317	-	304,868,124	1,829,209	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	
14	304,868,124	-	310,965,486	1,865,793	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
15	310,965,486	-	317,184,796	1,903,109	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
16	317,184,796	-	323,528,492	1,941,171	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
17	323,528,492	-	329,999,062	1,979,994	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
18	329,999,062	-	336,599,043	2,019,594	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
19	336,599,043	-	343,331,024	2,059,986	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
20	343,331,024	-	350,197,644	2,101,186	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
21	350,197,644	-	357,201,597	2,143,210	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
22	357,201,597	-	364,345,629	2,186,074	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
23	364,345,629	-	371,632,542	2,229,795	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
24	371,632,542	-	379,065,192	2,274,391	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
25	379,065,192	-	386,646,496	2,319,879	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
26	386,646,496	-	394,379,426	2,366,277	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
27	394,379,426	-	402,267,015	2,413,602	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
28	402,267,015	-	410,312,355	2,461,874	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
29	410,312,355	-	418,518,602	2,511,112	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
30	418,518,602	-	426,888,974	2,561,334	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
31	426,888,974	-	435,426,754	2,612,561	(250,000)	(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
32	435,426,754	-	444,135,289	2,664,812		(255,000)	(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
33	444,135,289	-	453,017,994	2,718,108			(260,100)	(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
34	453,017,994	-	462,078,354	2,772,470				(265,302)	(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
35	462,078,354	-	471,319,921	2,827,920					(270,608)	(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
36	471,319,921	-	480,746,320	2,884,478						(26,020)	(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
37	480,746,320	-	490,361,246	2,942,167							(26,541)	(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
38	490,361,246	-	500,168,471	3,001,011								(27,071)	(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
39	500,168,471	-	510,171,841	3,061,031									(27,613)	(28,165)	(28,728)	(29,303)	(29,889)
40	510,171,841	-	520,375,277	3,122,252										(28,165)	(28,728)	(29,303)	(29,889)
41	520,375,277	-	530,782,783	3,184,697											(28,728)	(29,303)	(29,889)
42	530,782,783	-	541,398,439	3,248,391												(29,303)	(29,889)
43	541,398,439	-	552,226,407	3,313,358													(29,889)
44	552,226,407	-	563,270,936	3,379,626													
45	563,270,936	-	574,536,354	3,447,218													
46	574,536,354	-	586,027,081	3,516,162													
47	586,027,081	-	597,747,623	3,586,486													
48	597,747,623	-	609,702,575	3,658,215													
49	609,702,575	-	621,896,627	3,731,380													
50	621,896,627	-	634,334,559	3,806,007													
Totals	**19,216,727,972**	**1,000**	**19,851,062,531**	**119,106,375**	**(7,500,000)**	**(7,650,000)**	**(7,803,000)**	**(7,959,060)**	**(8,118,241)**	**(780,606)**	**(796,218)**	**(812,143)**	**(828,385)**	**(844,953)**	**(861,852)**	**(879,089)**	**(896,671)**

Notes
(1) (Net of Housing and Pass-Thrus to Local Taxing Agencies

Salton Sea Authority
Tax Allocation Revenue Bonds, Series 2006
Solana Beach Redevelopment Project
Debt Service Capacity Model (AV Base of Zero, Projection of New Development and AV Growth at

Tax Increment Growth Rate	2.00%
Debt Service Coverage Ratio	1.200
Present Value Rate	5.00%
Gross Tax Rate	1.00%
Net Amount After Housing and Pass-Thrus	60.00%

Base Year AV	-
Residential Units	1,000
AV Per Unit	250,000

Year	Beginning Incremental AV	Residential Units Added	Ending Incremental AV	Total Net Tax Inc. Avail For DS (1)	Less: DS Series 14	Less: DS Series 15	Less: DS Series 16	Less: DS Series 17	Less: DS Series 18	Less: DS Series 19	Less: DS Series 20	Less: DS Series 21	Less: DS Series 22	Less: DS Series 23	Less: DS Series 24	Less: DS Series 25	Less: DS Series 26
				Par Amount	468,657	478,030	487,591	497,343	507,289	517,435	527,784	530,237	532,163	533,513	534,229	534,252	533,520
				Net Proceeds	413,824	422,101	430,543	439,154	447,937	456,895	466,033	468,199	469,900	471,092	471,724	471,745	471,098
1	-	200	50,000,000	300,000													
2	50,000,000	200	101,000,000	606,000													
3	101,000,000	200	153,020,000	918,120													
4	153,020,000	200	206,080,400	1,236,482													
5	206,080,400	200	260,202,008	1,561,212													
6	260,202,008	-	265,406,048	1,592,436													
7	265,406,048	-	270,714,169	1,624,285													
8	270,714,169	-	276,128,453	1,656,771													
9	276,128,453	-	281,651,022	1,689,906													
10	281,651,022	-	287,284,042	1,723,704													
11	287,284,042	-	293,029,723	1,758,178													
12	293,029,723	-	298,890,317	1,793,342													
13	298,890,317	-	304,868,124	1,829,209													
14	304,868,124	-	310,965,486	1,865,793													
15	310,965,486	-	317,184,796	1,903,109	(30,487)												
16	317,184,796	-	323,528,492	1,941,171	(30,487)	(31,097)											
17	323,528,492	-	329,999,062	1,979,994	(30,487)	(31,097)	(31,718)										
18	329,999,062	-	336,599,043	2,019,594	(30,487)	(31,097)	(31,718)	(32,353)									
19	336,599,043	-	343,331,024	2,059,986	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)								
20	343,331,024	-	350,197,644	2,101,186	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)							
21	350,197,644	-	357,201,597	2,143,210	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)						
22	357,201,597	-	364,345,629	2,186,074	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)					
23	364,345,629	-	371,632,542	2,229,795	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)				
24	371,632,542	-	379,065,192	2,274,391	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)			
25	379,065,192	-	386,646,496	2,319,879	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)		
26	386,646,496	-	394,379,426	2,366,277	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	
27	394,379,426	-	402,267,015	2,413,602	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
28	402,267,015	-	410,312,355	2,461,874	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
29	410,312,355	-	418,518,602	2,511,112	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
30	418,518,602	-	426,888,974	2,561,334	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
31	426,888,974	-	435,426,754	2,612,561	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
32	435,426,754	-	444,135,289	2,664,812	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
33	444,135,289	-	453,017,994	2,718,108	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
34	453,017,994	-	462,078,354	2,772,470	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
35	462,078,354	-	471,319,921	2,827,920	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
36	471,319,921	-	480,746,320	2,884,478	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
37	480,746,320	-	490,361,246	2,942,167	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
38	490,361,246	-	500,168,471	3,001,011	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
39	500,168,471	-	510,171,841	3,061,031	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
40	510,171,841	-	520,375,277	3,122,252	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
41	520,375,277	-	530,782,783	3,184,697	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
42	530,782,783	-	541,398,439	3,248,391	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
43	541,398,439	-	552,226,407	3,313,358	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
44	552,226,407	-	563,270,936	3,379,626	(30,487)	(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
45	563,270,936	-	574,536,354	3,447,218		(31,097)	(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
46	574,536,354	-	586,027,081	3,516,162			(31,718)	(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
47	586,027,081	-	597,747,623	3,586,486				(32,353)	(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
48	597,747,623	-	609,702,575	3,658,215					(33,000)	(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
49	609,702,575	-	621,896,627	3,731,380						(33,660)	(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
50	621,896,627	-	634,334,559	3,806,007							(34,333)	(35,020)	(35,720)	(36,435)	(37,163)	(37,907)	(38,665)
Totals	19,216,727,972	1,000	19,851,062,531	119,106,375	(914,604)	(932,896)	(951,554)	(970,585)	(989,997)	(1,009,797)	(1,029,993)	(1,015,573)	(1,000,164)	(983,733)	(966,245)	(947,663)	(927,952)

Notes
(1) (Net of Housing and Pass-Thrus to Local Taxing Agencies

Salton Sea Authority
Tax Allocation Revenue Bonds, Series 2006
Solana Beach Redevelopment Project
Debt Service Capacity Model (AV Base of Zero, Projection of New Development and AV Growth at

Tax Increment Growth Rate	2.00%
Debt Service Coverage Ratio	1.200
Present Value Rate	5.00%
Gross Tax Rate	1.00%
Net Amount After Housing and Pass-Thrus	60.00%

Base Year AV	-
Residential Units	1,000
AV Per Unit	250,000

Year	Beginning Incremental AV	Residential Units Added	Ending Incremental AV	Total Net Tax Inc. Avail For DS (1)	Less: DS Series 27	Less: DS Series 28	Less: DS Series 29	Less: DS Series 30	Less: DS Series 31	Less: DS Series 32	Less: DS Series 33	Less: DS Series 34	Less: DS Series 35	Less: DS Series 36	Less: DS Series 37	Less: DS Series 38	Less: DS Series 39
				Par Amount	531,962	529,504	526,068	521,567	3,537,239	3,489,841	3,433,106	3,366,252	3,288,440	724,107	700,904	674,560	644,824
				Net Proceeds	469,722	467,552	464,518	460,543	3,123,382	3,081,529	3,031,432	2,972,401	2,903,693	639,387	618,898	595,637	569,380
1	-	200	50,000,000	300,000													
2	50,000,000	200	101,000,000	606,000													
3	101,000,000	200	153,020,000	918,120													
4	153,020,000	200	206,080,400	1,236,482													
5	206,080,400	200	260,202,008	1,561,212													
6	260,202,008	-	265,406,048	1,592,436													
7	265,406,048	-	270,714,169	1,624,285													
8	270,714,169	-	276,128,453	1,656,771													
9	276,128,453	-	281,651,022	1,689,906													
10	281,651,022	-	287,284,042	1,723,704													
11	287,284,042	-	293,029,723	1,758,178													
12	293,029,723	-	298,890,317	1,793,342													
13	298,890,317	-	304,868,124	1,829,209													
14	304,868,124	-	310,965,486	1,865,793													
15	310,965,486	-	317,184,796	1,903,109													
16	317,184,796	-	323,528,492	1,941,171													
17	323,528,492	-	329,999,062	1,979,994													
18	329,999,062	-	336,599,043	2,019,594													
19	336,599,043	-	343,331,024	2,059,986													
20	343,331,024	-	350,197,644	2,101,186													
21	350,197,644	-	357,201,597	2,143,210													
22	357,201,597	-	364,345,629	2,186,074													
23	364,345,629	-	371,632,542	2,229,795													
24	371,632,542	-	379,065,192	2,274,391													
25	379,065,192	-	386,646,496	2,319,879													
26	386,646,496	-	394,379,426	2,366,277													
27	394,379,426	-	402,267,015	2,413,602													
28	402,267,015	-	410,312,355	2,461,874	(39,438)												
29	410,312,355	-	418,518,602	2,511,112	(39,438)	(40,227)											
30	418,518,602	-	426,888,974	2,561,334	(39,438)	(40,227)	(41,031)										
31	426,888,974	-	435,426,754	2,612,561	(39,438)	(40,227)	(41,031)	(41,852)									
32	435,426,754	-	444,135,289	2,664,812	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)								
33	444,135,289	-	453,017,994	2,718,108	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)							
34	453,017,994	-	462,078,354	2,772,470	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)	(304,514)						
35	462,078,354	-	471,319,921	2,827,920	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)	(304,514)	(310,604)					
36	471,319,921	-	480,746,320	2,884,478	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)	(304,514)	(310,604)	(316,816)				
37	480,746,320	-	490,361,246	2,942,167	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)	(304,514)	(310,604)	(316,816)	(73,152)			
38	490,361,246	-	500,168,471	3,001,011	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)	(304,514)	(310,604)	(316,816)	(73,152)	(74,615)		
39	500,168,471	-	510,171,841	3,061,031	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)	(304,514)	(310,604)	(316,816)	(73,152)	(74,615)	(76,108)	
40	510,171,841	-	520,375,277	3,122,252	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)	(304,514)	(310,604)	(316,816)	(73,152)	(74,615)	(76,108)	(77,630)
41	520,375,277	-	530,782,783	3,184,697	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)	(304,514)	(310,604)	(316,816)	(73,152)	(74,615)	(76,108)	(77,630)
42	530,782,783	-	541,398,439	3,248,391	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)	(304,514)	(310,604)	(316,816)	(73,152)	(74,615)	(76,108)	(77,630)
43	541,398,439	-	552,226,407	3,313,358	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)	(304,514)	(310,604)	(316,816)	(73,152)	(74,615)	(76,108)	(77,630)
44	552,226,407	-	563,270,936	3,379,626	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)	(304,514)	(310,604)	(316,816)	(73,152)	(74,615)	(76,108)	(77,630)
45	563,270,936	-	574,536,354	3,447,218	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)	(304,514)	(310,604)	(316,816)	(73,152)	(74,615)	(76,108)	(77,630)
46	574,536,354	-	586,027,081	3,516,162	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)	(304,514)	(310,604)	(316,816)	(73,152)	(74,615)	(76,108)	(77,630)
47	586,027,081	-	597,747,623	3,586,486	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)	(304,514)	(310,604)	(316,816)	(73,152)	(74,615)	(76,108)	(77,630)
48	597,747,623	-	609,702,575	3,658,215	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)	(304,514)	(310,604)	(316,816)	(73,152)	(74,615)	(76,108)	(77,630)
49	609,702,575	-	621,896,627	3,731,380	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)	(304,514)	(310,604)	(316,816)	(73,152)	(74,615)	(76,108)	(77,630)
50	621,896,627	-	634,334,559	3,806,007	(39,438)	(40,227)	(41,031)	(41,852)	(292,689)	(298,543)	(304,514)	(310,604)	(316,816)	(73,152)	(74,615)	(76,108)	(77,630)
Totals	19,216,727,972	1,000	19,851,062,531	119,106,375	(907,073)	(884,987)	(861,656)	(837,037)	(5,561,089)	(5,373,768)	(5,176,730)	(4,969,661)	(4,752,238)	(1,024,131)	(969,998)	(913,290)	(853,927)

Notes
(1) (Net of Housing and Pass-Thrus to Local Taxing Agencies

Salton Sea Authority
Tax Allocation Revenue Bonds, Series 2006
Solana Beach Redevelopment Project
Debt Service Capacity Model (AV Base of Zero, Projection of New Development and AV Growth at

Tax Increment Growth Rate	2.00%
Debt Service Coverage Ratio	1.200
Present Value Rate	5.00%
Gross Tax Rate	1.00%
Net Amount After Housing and Pass-Thrus	60.00%

Base Year AV	-
Residential Units	1,000
AV Per Unit	250,000

				Par Amount	611,425	574,070	532,448	486,222	435,035	378,499	316,200	247,695	172,506	90,124	55,927,491		
				Net Proceeds	539,888	506,904	470,151	429,334	384,136	334,214	279,205	218,714	152,323	79,579	49,383,974		
Year	Beginning Incremental AV	Residential Units Added	Ending Incremental AV	Total Net Tax Inc. Avail For DS (1)	Less: DS Series 40	Less: DS Series 41	Less: DS Series 42	Less: DS Series 43	Less: DS Series 44	Less: DS Series 45	Less: DS Series 46	Less: DS Series 47	Less: DS Series 48	Less: DS Series 49	Total DS	Total Net Tax Inc. After DS	Annual Coverage
1	-	200	50,000,000	300,000											-	300,000	N/A
2	50,000,000	200	101,000,000	606,000											(250,000)	356,000	1.200
3	101,000,000	200	153,020,000	918,120											(505,000)	413,120	1.200
4	153,020,000	200	206,080,400	1,236,482											(765,100)	471,382	1.200
5	206,080,400	200	260,202,008	1,561,212											(1,030,402)	530,810	1.200
6	260,202,008	-	265,406,048	1,592,436											(1,301,010)	291,426	1.200
7	265,406,048	-	270,714,169	1,624,285											(1,327,030)	297,255	1.200
8	270,714,169	-	276,128,453	1,656,771											(1,353,571)	303,200	1.200
9	276,128,453	-	281,651,022	1,689,906											(1,380,642)	309,264	1.200
10	281,651,022	-	287,284,042	1,723,704											(1,408,255)	315,449	1.200
11	287,284,042	-	293,029,723	1,758,178											(1,436,420)	321,758	1.200
12	293,029,723	-	298,890,317	1,793,342											(1,465,149)	328,193	1.200
13	298,890,317	-	304,868,124	1,829,209											(1,494,452)	334,757	1.200
14	304,868,124	-	310,965,486	1,865,793											(1,524,341)	341,452	1.200
15	310,965,486	-	317,184,796	1,903,109											(1,554,827)	348,281	1.200
16	317,184,796	-	323,528,492	1,941,171											(1,585,924)	355,247	1.200
17	323,528,492	-	329,999,062	1,979,994											(1,617,642)	362,352	1.200
18	329,999,062	-	336,599,043	2,019,594											(1,649,995)	369,599	1.200
19	336,599,043	-	343,331,024	2,059,986											(1,682,995)	376,991	1.200
20	343,331,024	-	350,197,644	2,101,186											(1,716,655)	384,531	1.200
21	350,197,644	-	357,201,597	2,143,210											(1,750,988)	392,221	1.200
22	357,201,597	-	364,345,629	2,186,074											(1,786,008)	400,066	1.200
23	364,345,629	-	371,632,542	2,229,795											(1,821,728)	408,067	1.200
24	371,632,542	-	379,065,192	2,274,391											(1,858,163)	416,228	1.200
25	379,065,192	-	386,646,496	2,319,879											(1,895,326)	424,553	1.200
26	386,646,496	-	394,379,426	2,366,277											(1,933,232)	433,044	1.200
27	394,379,426	-	402,267,015	2,413,602											(1,971,897)	441,705	1.200
28	402,267,015	-	410,312,355	2,461,874											(2,011,335)	450,539	1.200
29	410,312,355	-	418,518,602	2,511,112											(2,051,562)	459,550	1.200
30	418,518,602	-	426,888,974	2,561,334											(2,092,593)	468,741	1.200
31	426,888,974	-	435,426,754	2,612,561											(2,134,445)	478,116	1.200
32	435,426,754	-	444,135,289	2,664,812											(2,177,134)	487,678	1.200
33	444,135,289	-	453,017,994	2,718,108											(2,220,676)	497,432	1.200
34	453,017,994	-	462,078,354	2,772,470											(2,265,090)	507,380	1.200
35	462,078,354	-	471,319,921	2,827,920											(2,310,392)	517,528	1.200
36	471,319,921	-	480,746,320	2,884,478											(2,356,600)	527,878	1.200
37	480,746,320	-	490,361,246	2,942,167											(2,403,732)	538,436	1.200
38	490,361,246	-	500,168,471	3,001,011											(2,451,806)	549,205	1.200
39	500,168,471	-	510,171,841	3,061,031											(2,500,842)	560,189	1.200
40	510,171,841	-	520,375,277	3,122,252											(2,550,859)	571,392	1.200
41	520,375,277	-	530,782,783	3,184,697	(79,182)										(2,601,876)	582,820	1.200
42	530,782,783	-	541,398,439	3,248,391	(79,182)	(80,766)									(2,653,914)	594,477	1.200
43	541,398,439	-	552,226,407	3,313,358	(79,182)	(80,766)	(82,381)								(2,706,992)	606,366	1.200
44	552,226,407	-	563,270,936	3,379,626	(79,182)	(80,766)	(82,381)	(84,029)							(2,761,132)	618,494	1.200
45	563,270,936	-	574,536,354	3,447,218	(79,182)	(80,766)	(82,381)	(84,029)	(85,709)						(2,816,355)	630,863	1.200
46	574,536,354	-	586,027,081	3,516,162	(79,182)	(80,766)	(82,381)	(84,029)	(85,709)	(87,424)					(2,872,682)	643,481	1.200
47	586,027,081	-	597,747,623	3,586,486	(79,182)	(80,766)	(82,381)	(84,029)	(85,709)	(87,424)	(89,172)				(2,930,135)	656,350	1.200
48	597,747,623	-	609,702,575	3,658,215	(79,182)	(80,766)	(82,381)	(84,029)	(85,709)	(87,424)	(89,172)	(90,956)			(2,988,738)	669,477	1.200
49	609,702,575	-	621,896,627	3,731,380	(79,182)	(80,766)	(82,381)	(84,029)	(85,709)	(87,424)	(89,172)	(90,956)	(92,775)		(3,048,513)	682,867	1.200
50	621,896,627	-	634,334,559	3,806,007	(79,182)	(80,766)	(82,381)	(84,029)	(85,709)	(87,424)	(89,172)	(90,956)	(92,775)	(94,630)	(3,109,483)	696,524	1.200
Totals	19,216,727,972	1,000	19,851,062,531	119,106,375	(791,823)	(726,893)	(659,050)	(588,202)	(514,257)	(437,118)	(356,688)	(272,867)	(185,549)	(94,630)	(96,083,640)	23,022,735	

Notes
(1) (Net of Housing and Pass-Thrus to Local Taxing Agencies

January 24, 2007

Chairman Richard Milanovich
Agua Caliente Band of Cahuilla Indians
600 Tahquitz Canyon Way
Palm Springs, CA 92262

Dear Chairman Milanovich:

The Salton Sea Authority is applying for financial assistance from the Indian Gaming Special Distribution Fund. The funds are to support the planning costs for the Salton Sea Authority Plan for Multi-Purpose Project. This is a major undertaking that needs your support.

I have attached a copy of our Indian Gaming Special Distribution Fund Grant Application for your review and would like you to consider providing the Salton Sea Authority with a formal Tribal sponsorship letter. The Authority has adopted a restoration plan and is conducting community outreach in order to be selected by the State of California as the Preferred Alternative.

I welcome the opportunity to visit with you and answer your questions.

Respectfully,

Rick Daniels
Executive Director

Cc: R.Wilson, County of Riverside
M.Ashley, County of Riverside

78-401 Highway 111, Suite T ✧ La Quinta, CA 92253 ✧ (760) 564-4888 ✧ [illegible]

Indian Gaming Special Distribution Fund
Local Government Mitigation
Grant Application

Name of jurisdiction: Salton Sea Authority

Mitigation funding is desired for impacts associated with: Agua Caliente Band of Cahuilla Indians
(casino name)

Type of grant for which you are applying: (mark 60% Nexus or either 20% non-Nexus)

☐ 60% Nexus Grant

Please circle the letters that apply: (must meet a minimum of two nexus criteria)

a. City or County borders the tribal land on all sides;
b. City or County partially borders tribal land;
c. City or County maintains a highway, road, or other thoroughfare that is predominant access route to a casino that is located within 4 miles;
d. All or part of the City or County is located within 4 miles of the casino.

- ✓ 50% awarded (on a pro-rata basis) to jurisdictions meeting all 4 nexus test criteria
- ✓ 30% awarded to jurisdictions that meet 3 of the nexus test criteria
- ✓ 20% awarded to jurisdictions that meet 2 of the nexus test criteria

X 20% Non-Nexus Grant

Local jurisdictions impacted by tribal casinos paying into the Special Distribution Fund

X 20% Non-Nexus Grant

Local jurisdictions impacted by tribal casinos NOT paying into the Special Distribution Fund and assistance to jurisdictions for one-time large capital projects

Amount of mitigation funding requested through this application: $100,000

Authorized Signature

Executive Director
Title

Salton Sea Authority
Agency

Legal address of jurisdiction: 78-401 Highway 111, Suite T, La Quinta, CA 92253

Federal Tax ID Number: 33-0883611

Day to day operation contact:	Phone:	Fax:	E-mail Address:
Geniene D. Croft	(760) 564-4888	(760) 564-5288	gcroft@saltonsea.ca.gov

Grant project is for:

☐ Law enforcement	X Environmental impacts	☐ Waste disposal
☐ Fire services	☐ Emergency medical services	X Water supplies
☐ Behavioral Health	X Recreation & Youth programs	X Public Health
☐ Child care programs	X Planning & adjacent land uses	☐ Roads

☐ Other (briefly describe)_____

On a separate sheet(s) of paper, **describe the impacts** associated with the Tribal casino and/or gaming (please include historical data, if available). ***Exhibit A***

On a separate sheet(s) of paper, provide a complete **description of** the project, including the effect it will have on the specific impacts described above. ***Exhibit B***

What is the total cost of the project? $5Billion

Is this application being submitted to other Tribal governments? X Yes ☐ No

If so, please provide the Tribal name(s): 29 Palms Band of Mission Indians, Augustine Band of Cahuilla Mission Indians, Cabazon Band of Mission Indians, Morongo Band of Mission Indians

Name any other sources of funding that will be contributed toward the project and the amount provided by each source: Riverside County $150,000 Imperial County $150,000 Imperial Irrigation District 150,000 Coachella Valley Water District $150,000 Torres Martinez Desert Cahuilla Indians $20,000

Will the project be competitively bid? X Yes ☐ No

Is the project subject to Public Works requirements? X Yes ☐ No

What is the project time frame? 20 Years

==========

For Completion by Tribal Government

To be considered for funding, this application must include a formal letter of sponsorship from the Tribal Chairman, or designated authority, operating the Tribal casino for which mitigation is being requested

Is a formal Tribal sponsorship letter attached? ☐ Yes X No

LETTER IS IN PROGRESS

EXHIBIT A

The Salton Sea Basin

The Salton Sea Basin is part of the Lower Colorado River Delta system and, over geologic timescales: Lakes have existed in the basin as the course of the Colorado River shifted, most recently, several hundred years ago.

Prior to the current Salton Sea formation, Lake Cahuilla formed periodically in the basin and provided support for tribal dwellers in the area. Currently, land owned by the Torres Martinez Desert Cahuilla Indian Tribe (the Tribe) is located along the northwest shore of the Sea. The Torres Martinez Cahuilla Indians are a major stakeholder in the Salton Sea. Approximately forty percent of the Torres Martinez Reservation is under water in the Salton Sea. The Coachella Valley storm channel which provides drainage to all Indian Reservations in the Coachella Valley discharges into the Salton Sea which encompasses a portion of the Torres Martinez Reservation. The channel is listed on the Clean Water Act (CWA) Section 303(d) List of impaired surface water because of violation of bacterial water quality objectives and the threat of toxic bioassay results (San Diego State University). The Authority's Plan would provide a restored Sea along the current shoreline coupled with the development of habitat area that could stimulate development and improve the economic conditions for the Tribes and Imperial and Riverside counties.

The Authority has developed and is advancing a combined, multi-purpose revitalization/restoration project aimed at concurrently: (1) restoring the Sea as a nationally important wildlife refuge; (2) maintaining the Sea as a vital link along the International Pacific Flyway; (3) preserving local tribal heritage and cultural values associated with the Sea; (4) reducing odor and other water and air quality problems; (5) reestablishing the Sea as a tourist destination and recreational playground; and (6) revitalizing the Sea as a local economic development engine.

The project has been developed to a conceptual level at this time. Greater details will be developed in concert with site-specific environmental documentation and entitlements at the next stage of analysis. Exact locations and facilities will be determined during these subsequent reviews and a site-specific Environmental Impact Statement/Report (EIS/EIR) will be prepared. Reviews of this project will involve numerous local, State and Federal regulatory agencies.

Restoration of the Salton Sea is projected to increase ecological and recreational tourism to the Coachella and Imperial Valleys by $3 million to $3.5 million annually from international and regional sources. Increased tourism will boost the local economy for reservations and communities along I-10, Highway 111 and Highway 86 corridors for hotels, restaurants, retail and entertainment.

EXHIBIT B

Planning a Vision for the Future

- Conceptual Plan for Salton Sea Revitalization and Restoration including Land-Use Plan for the Authority's 300,000 acre Planning and Financing District Surrounding the Sea.

- In-Sea Barrier & Circulation Channels to separate the current Sea into two separate bodies (an outer "two lake" water system and multiple habitat complex areas, salt deposit area, and brine pool) with a channel for circulating water between the two lakes in the outer water system.

- Water Treatment Facilities to improve both the existing water in the Sea and the inflow water as necessary to lessen or greatly reduce the Sea's eutrophication problem and to improve the clarity and quality of the water in both lakes to meet the recreational water quality standards set by the Regional Water Quality Control Board.

- Habitat Enhancement Features to meet the needs of fish and bird populations consistent with State laws that require the "maximum feasible attainment" of specified ecosystem restoration goals.

- Colorado River Water Storage Reservoir to enable the water agency to store Colorado River water to have greater flexibility for balancing supply and demand of Colorado River water use.

- Park, Open Space, and Wildlife Areas including the Salton Sea State Recreation Area and the Sonny Bono National Wildlife Refuge will be preserved although it is envisioned that the boundaries of the Refuge will be modified to match the newly created habitat features.

In addition to the features discussed above that are designed to address water quality problems and the potential air quality concerns associated with exposed lakebed, a plan for development of areas around the Sea has be prepared. The plan was prepared to guide creation of "Seaside Villages" and the build-out of over 250,000 new homes with accompanying entertainment, recreational, retail and business establishments within specified areas of the Authority's 300,000-acre planning and financing district around the Sea.

January 24, 2007

Chairman Darrell Mike
Twenty-Nine Palms Band of Mission Indians
46-200 Harrison Place
Coachella, CA 92236

Dear Chairman Mike

The Salton Sea Authority is applying for financial assistance from the Indian Gaming Special Distribution Fund. The funds are to support the planning costs for the Salton Sea Authority Plan for Multi-Purpose Project. This is a major undertaking that needs your support.

I have attached a copy of our Indian Gaming Special Distribution Fund Grant Application for your review and would like you to consider providing the Salton Sea Authority with a formal Tribal sponsorship letter. The Authority has adopted a restoration plan and is conducting community outreach in order to be selected by the State of California as the Preferred Alternative.

I welcome the opportunity to visit with you and answer your questions.

Respectfully,

Rick Daniels
Executive Director

Cc. R.Wilson, County of Riverside
M.Ashley, County of Riverside

January 24, 2007

Chairman Robert Martin
Morongo Band of Mission Indians
11581 Potrero Road
Banning, CA 92220-2965

Dear Chairman Martin:

The Salton Sea Authority is applying for financial assistance from the Indian Gaming Special Distribution Fund. The funds are to support the planning costs for the Salton Sea Authority Plan for Multi-Purpose Project. This is a major undertaking that needs your support.

I have attached a copy of our Indian Gaming Special Distribution Fund Grant Application for your review and would like you to consider providing the Salton Sea Authority with a formal Tribal sponsorship letter. The Authority has adopted a restoration plan and is conducting community outreach in order to be selected by the State of California as the Preferred Alternative.

I welcome the opportunity to visit with you and answer your questions.

Respectfully,

Rick Daniels
Executive Director

Cc: R.Wilson, County of Riverside
M.Ashley, County of Riverside

78-401 Highway 111, Suite T ✧ La Quinta, CA 92253 ✧ (760) 564-4888 ✧ Fax (760) 564-5288

January 24, 2007

Chairman John James
Cabazon Band of Mission Indians
84-245 Indio Springs Drive
Indio, CA 92201

Dear Chairman James:

The Salton Sea Authority is applying for financial assistance from the Indian Gaming Special Distribution Fund. The funds are to support the planning costs for the Salton Sea Authority Plan for Multi-Purpose Project. This is a major undertaking that needs your support.

I have attached a copy of our Indian Gaming Special Distribution Fund Grant Application for your review and would like you to consider providing the Salton Sea Authority with a formal Tribal sponsorship letter. The Authority has adopted a restoration plan and is conducting community outreach in order to be selected by the State of California as the Preferred Alternative.

I welcome the opportunity to visit with you and answer your questions.

Respectfully,

Rick Daniels
Executive Director

Cc: R.Wilson, County of Riverside
M.Ashley, County of Riverside

78-401 Highway 111, Suite T ✧ La Quinta, CA 92253 ✧ (760) 564-4889 ✧ Fax (760) 564-5288

January 24, 2007

Chairwoman Mary Ann Martin
Augustine Band of Mission Indians
P.O Box 846
Coachella, CA 92236

Dear Chairwoman Martin:

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Salton Sea Authority

JURISDICTIONS SUPPORTING THE SALTON SEA AUTHORITY RESTORATION PLAN

Governmental Agencies

County of Riverside
County of Imperial
Coachella Valley Water District
Imperial Irrigation District
Torres Martinez Desert Cahuilla Indians
City of La Quinta
City of Coachella
City of Cathedral City
City of Indio
City of Calexico
City of Desert Hot Springs
City of Palm Springs
City of El Centro
City of Rancho Mirage
Desert Water Agency
Desert Healthcare District
Salton Community Services District
Coachella Valley Association of Governments
Coachella Valley Enterprise Zone
Jacqueline Cochran Regional Airport Authority
Mecca Community Council
Oasis Community Council
North Shore Community Council
Sky Valley Community Council
Indio Hills Community Council
Hot Springs Community Council
Thermal Community Council
Riverside County Workforce Development Board
Mt. San Jacinto Winter Park Authority
Palm Springs Desert Resorts Convention and Visitors Authority
Desert Alliance for Community Empowerment

Salton Sea Authority

JURISDICTIONS SUPPORTING THE SALTON SEA AUTHORITY RESTORATION PLAN

Non-Governmental Agencies

Palm Springs Economic Development Corporation
Coachella Valley Economic Partnership
Imperial Valley Economic Development Corporation
Imperial Valley Board of Realtors
Rancho Housing Alliance, Inc
Building Industry Association
Imperial Valley Joint Chambers of Commerce
Palm Desert Chamber of Commerce
West Shores Chamber of Commerce
Imperial Chamber of Commerce
Indio Chamber of Commerce
Calexico Chamber of Commerce
Palm Springs Chamber of Commerce
Rancho Mirage Chamber of Commerce
Brawley Chamber of Commerce
La Quinta Chamber of Commerce
Coachella Chamber of Commerce
El Centro Chamber of Commerce
All Valley Legislative Coalition

SALTON SEA REVITALIZATION PROGRAM

PROPOSAL FOR PILOT PROGRAMS

Prepared by:
The Salton Sea Authority
February 2007

Salton Sea Authority

Contents

1.0 Introduction

In 2005, Congress authorized $26 million for the Salton Sea Restoration as part of the Water Resources Development Act. That Congressional authorization expired but is under consideration for reauthorization this year. The original authorization would have made available $26 million in Federal funding with a requirement for an additional 35 percent in matching funds from other sources. The funds were designated for pilot projects with a maximum of $5 million in Federal funding per project. The Salton Sea Authority now intends to communicate that while there are a few pilot projects left, it is time to begin to design, permit, and construct a restoration project. As such the Authority is seeking funds to start the site specific environmental compliance process and the design work necessary for the environmental reviews and entitlements.

The Salton Sea Authority intends to seek authorization of the following projects at $5 million in Federal funding for each of the following projects, plus $1 million for project management:

- **Early Start Habitat** would involve construction of 500-1000 acres of bird habitat at the south end of the Sea.
- **Environmental Compliance Documentation** would include documentation for the early-start habitat area plus a site-specific Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) for the entire revitalization program.
- **Controlled Eutrophication Project** would involve construction of a wetlands-type phosphorous removal system on the New and/or Alamo River or within the south end of the Sea, based upon the successful research at the Kent Sea Tech operation.
- **Environmental Monitoring Program** by USGS to establish background data and monitoring protocol for the overall project construction and operation necessary for “adaptive management”.
- **Preliminary Design Work** necessary to frame the project upon which the EIR/S would be performed.

Each of these projects is discussed briefly on the following pages. For each project, the $5 million in Federal funding would require 35 percent in matching funds or $1.75 million. In addition, the $1.0 million funding for project management would require $350,000 in matching funds. The Authority proposes to apply for grants for matching funding from sources such as the Wildlife Conservation Board.

2.0 Early Start Habitat

The early start habitat pilot project will provide an opportunity to actually begin the restoration process. The habitat development will include planning, design, surveys and other investigations, and the construction necessary to develop the early-start habitat area. Initial tasks will include planning and coordination, preparation of environmental compliance documents for the early start habitat area and any surveys that are conducted as part of the design process.

2.1 Planning and Coordination

Development of initial plans will involve extensive planning and coordination process to determine the most appropriate location and design goals for the area. A multi-agency task force is proposed to advise on and oversee this process..

2.2 Early-Start Habitat Environmental Compliance

Environmental compliance for the early start habitat area will include biological and cultural resource surveys and preparation of environmental assessments in compliance with NEPA and Initial Studies in compliance with CEQA. It will be critical to initiate the habitat-related environmental tasks as soon as possible so that they may be completed concurrently with the preparation of detailed design plans for the early start habitat area. Conceptual plans will be needed to complete the environmental documentation tasks. Tasks required to complete the conceptual plans will include site review and screening, aerial imagery, site selection, and preparation of conceptual plan drawings. Detailed design tasks can be prepared while environmental documents are under public and agency review. These tasks will involve topological surveys and preparation of design plans and specifications.

2.3 Permitting

Several permits would be required from a variety of agencies in order to proceed with the early-start habitat project. Permits would be needed for any features of the project that involve the filling of existing wetlands, the disturbance of creek beds, river beds, lake beds or the seabed, the disturbance of more than 0.5 acres of soils on dry land, and the potential for injury, harassment, harm or loss of life of a listed species. Potential impacts of the early-start habitat project and permits that may be required are detailed in Table 1.

Table 1. Impacts and Required Permits

Impact	Agency	Permit Name
Placement of fill into an existing Water of the US	US Army Corps of Engineers	Section 404 Permit
Placement of structure or structures into a navigable waterway	US Army Corps of Engineers	Section 10 of the Rivers and Harbors Act
Water quality	Regional Water Quality Control Board	Section 401 Water Quality Certification
Disturbance of creek bed, river bed, lake bed or sea bed	California Department of Fish and Game	Section 1602 Streambed Alteration Agreement/Waiver

Disturbance of more than 0.5 acres of soil	State Water Resources Control Board	General Construction Stormwater Permit
Potential for a listed species to be harassed, injured, harmed or killed	US Fish and Wildlife Service	ESA Section 7 Incidental Take Permit
The potential to release air emissions	ICAPCD or SCAQMD	

The length of time required for an agency to process and issue a permit varies greatly, and ample time needs to be allocated to the permit portion of the project.

2.4 Design and Construction

Designs for the early-start habitat will be prepared in two phases. The initial phase will involve preparation of the conceptual plans needed to complete the environmental documentation and permitting. Tasks required to complete the conceptual plans will include site review and screening, aerial imagery, site selection, and preparation of conceptual plan drawings. Detailed design tasks can be prepared while environmental documents are under public and agency review. These tasks will involve topological surveys and preparation of design plans and specifications.

Upon completion of the final reviews and approval of the environmental compliance documents and the plans and specifications, bid packages will be prepared and a construction contractor will be selected. The Authority will oversee the construction program. The operation and maintenance contract may be included as part of the construction bid package or issued through a separate procurement.

3.0 Site-Specific EIS/EIR

The environmental compliance process will include the surveys and other investigations necessary to achieve compliance with the suite of Federal and State environmental regulations that govern major projects in California. Initial tasks will include preparation of environmental compliance documents for the early start habitat area and any pilot projects that are conducted as part of the detailed design process. In conjunction with this activity, preparation can begin on a site-specific Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) which will be prepared in accordance with the requirements for implementing the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), respectively. Other key environmental compliance tasks will include an air conformity analysis in compliance with the Clean Air Act, biological surveys and assessments in accordance with the Endangered Species Act, and cultural resource surveys and Native American consultation to support compliance with the Antiquities Act and other related legislation.

3.1 Site-Specific EIS/EIR

The site-specific EIS/EIR will be prepared following the Council on Environmental Quality (CEQ) Regulations for Implementing NEPA as well as the State Guidelines for implementing CEQA. In accordance with those regulations, the document will tier from the Programmatic EIR that is currently under preparation by the State. Environmental Setting data from that document will be incorporated and updated as necessary. Other key information will be incorporated by reference. The environmental consequences of the Salton Sea Authority Plan, select alternatives to the Authority Plan, and the No Action Alternative will be evaluated.

3.2 Key Components of the EIS/EIR

The EIS/EIR will begin with an introduction that clearly explains the scope and format of the environmental analysis. The analysis will consist of a systematic assessment of the impacts associated with each alternative for each identified issue. We will consider all phases of the project when evaluating its impacts on the environment. Topics to be addressed for each resource issue are discussed below.

Affected Environment/Environmental Setting. The EIS/EIR will include a section describing the regional and local setting for each resource category. Careful attention will be placed on establishing an appropriate region of influence for each resource area. The affected environment/environmental setting for each resource category will provide a clear and definite analysis of the location, extent, and character of resources on and adjacent to the project site. The Tetra Tech project team will conduct a peer review of available data, and will incorporate relevant information into the applicable environmental setting sections.

Regulatory Setting. An overview of relevant local, state, and federal laws and regulations concerning the resource area will be presented. These will include such authorities as the California and Federal Endangered Species Acts, the Clean Air Act, and the Clean Water Act. An overview of the regulatory setting is provided in Table C-1.
Thresholds of Significance: To help determine whether a project may have a significant environmental effect, thresholds used in the environmental analysis will be based, where applicable, on legal standards, studies, surveys, reports, or other data. Tetra Tech will draw upon our experience from past similar projects and the significance assessments from the 1992 EIS/EIR. More general significance criteria will be developed where appropriate in consultation with PWD and USFS.

Environmental Consequences/Project Impacts: Environmental consequences/project impacts from construction activities and annual maintenance will be described for all alternatives. Impacts will be classified as direct or indirect, short- or long-term, and adverse or beneficial. Growth-inducing or unavoidable impacts will be clearly identified. All impacts also will be classified as Class I (significant adverse that cannot be mitigated to a less than significant level), Class II (significant adverse that can be mitigated to a less than significant level), Class III (adverse but not significant), or Class IV (beneficial).

Cumulative Impacts: As required by both NEPA and CEQA, the EIS/EIR also will include a discussion of cumulative impacts associated with the proposed project in conjunction with other closely related past, present, and reasonably foreseeable future projects. Carrying capacity, trends analysis and other appropriate cumulative impact assessment methodologies will be used.

Mitigation Measures: An important part of the Draft EIS/EIR will be identifying the need for and type of potential mitigation measures. Where applicable, measures will be divided into those incorporated into the project and those recommended by Tetra Tech. The EIS/EIR will describe how each measure avoids or substantially reduces the significant environmental effect. The EIS/EIR also will identify the responsible agency and the schedule for implementation. Mitigation identified will not include compliance with state, federal, or local laws or regulations, which will be discussed under impacts.

3.3 Environmental Issues

Operational Safety/Risk of Accidents: The risks associated with construction activities and annual maintenance of the alternatives will be assessed. The assessment will primarily focus on the standard operating procedures for earth working and other construction vehicles that will be used for initial facility construction and annual operation and maintenance

Air Quality: The air quality analysis will address air quality issues related to construction and operation of the project alternatives. We will follow EPA guidelines for estimating dust generation from construction activities and for emissions from construction vehicles. Emissions form exposed sea bed areas during the operational phase will also be evaluated. Impact significance will be evaluated in the context of the approved significance thresholds, which may include the local Air Pollution Control District CEQA Guidelines.

Land Use: In accordance with CEQA Guidelines Section 15125(b), the EIS/EIR also will include a description of the project's consistency with applicable county, city, state, and federal land use plans and policies. In particular, the document will address consistency with Riverside and Imperial County Land Use Plans.

Geology, Soils and Stability: The discussion of geology will include a brief overview of the geologic setting, including seismicity and seismic hazards, and on the characteristics of the sediments. Existing sediment characteristics will be discussed to the extent that data are available. The role of geologic processes will be discussed. Regulatory agencies, requirements, and industry standards for construction will be identified and briefly discussed as they relate to mitigation of geologic hazards. The setting will provide sufficient context to support the analysis of the potential impacts of each alternative.

Hydrology, Water Resources, and Water Quality: The discussion of water resources will provide a description of the hydrologic setting and watershed of the Littlerock Reservoir. The affected environment discussion will describe climate and rainfall, hydrologic features and boundaries, drainage, flood potential, ground water occurrence

and water quality, water quality and sediment yield, and beneficial uses. The extent of existing available water quality and hydrological data will be determined primarily from PWD records. County, USGS and other agency databases will also be consulted.

Visual Resources and Aesthetics: Visual resources will be evaluated using a systematic approach such as the USFS Scenery Management System (SMS) that evolved from and replaces the Visual Management System (VMS) defined in Agricultural Handbook #462 (FS 1995). The SMS provides for integration of aesthetics with other biological, physical, and social/cultural resources in the planning process. Visual impacts will be assessed with respect to appropriate visual quality objectives for the study area and will include photo pairings for each alternative. The photo pairings will show existing conditions side-by-side with a visual simulation of the same view with project facilities in-place. Both low water and high water conditions will be assessed.

Biological Resources: Biological resource information from the PEIR will be incorporated and updated as necessary with any more recent survey information that may be available. The desert pupfish endangered species habitat areas at the south end of the Sea will be identified on a map. In addition to a review of existing data bases, field surveys will be conducted if required through consultation with the USFS and CDFG. These could include a thorough investigation of the footprint of all construction areas by a qualified biologist to assess habitat and incidence of any protected plant and wildlife species. The biologist will evaluate the impacts on the species if they are found to be present, and recommend mitigation measures as necessary.
In the biological resources analysis, any permitting needs will be identified, such as Endangered Species Act (federal and state) compliance issues, Sections 404/10 permitting, and project compliance with the Migratory Bird Treaty Act. We will describe the process to resolve potential conflicts and will discuss findings with appropriate regulatory staff during the preparation of the EIS/EIR.

Recreation: The EIS/EIR will include a discussion of the effects of each alternative on recreational uses of the Sea and its surrounding area. Recreational uses of the current Sea will be discussed and compared to potential recreational uses of the area for the alternatives. Data from the Authority's previous investigation of recreational uses of the area will be incorporated.

Cultural Resources: The EIS/EIR will include cultural resource information from the previous investigations and areas of direct disturbance will be surveyed. Following data review, sensitivity areas and potential historic properties will be identified, if any. Potential effects to these areas will be analyzed, and mitigation strategies will be developed. For instance, some proposed facility sites could be relocated to avoid sensitive areas, if any are identified. The work will include a review of appropriate data bases and records repositories and review all cultural resources survey and evaluations completed in the past to ensure compliance under CEQA and the National Historic Preservation Act (NHPA) as well as Native American consultation for tribal lands that will be affected.

Transportation: The EIS/EIR will include an evaluation of existing transportation and safety conditions and those expected under each of the alternatives. Existing transportation conditions relevant to the study area and the alternatives will be described. The study area's roadways will be described in terms of classification and designation (e.g., arterial, Scenic Road, emergency response route, etc.), function, lanes and other features. In addition, key study intersections will be described in terms of existing traffic controls, turning lanes, and other features. For any alternatives that will re-route traffic during construction, travel demands will be forecast. Effects on traffic will likely be limited to short-term impacts on local traffic from construction vehicles and truck traffic during annual cleanout. For each alternative, the number of truck trips will be estimated and comparative roadway and intersection traffic projections will be provided.

Socioeconomics and Environmental Justice: The EIS/EIR will include a discussion of the demographics of the populations and work force in the area around the Salton Sea, including ethnic makeup, local economy, income and poverty levels, housing availability, and proximity to schools. The impact analysis will evaluate whether any of the alternatives will create a disproportionate risk to minority or low income populations (i.e., an environmental justice analysis). Because of the nature of the project, these impacts are expected to be minor. The impact analysis will also discuss how the implementation of the various alternatives could affect the local economy, job availability, income levels. The socioeconomic effects are likely to be beneficial in that some jobs or local business opportunities could be created.

Energy, Public Service and Utilities: Analysis of impacts to energy, public services, and utilities will begin with identifying the project's requirements for these services. This information will be obtained from local governments, as appropriate. The impact analysis will address any changes in need for utilities or public services as a result of continued operation. Analysis of the project alternatives will include discussions of any changes in energy, public service, or utilities requirements during construction or during annual maintenance. Any effects on water supply service will be identified.

Noise: The noise analyses will address noise issues related to construction of the embankments, water treatment facilities, habitat areas, and other project features as well as the annual maintenance of these facilities. The affected environment section will explain relevant terminology and noise guidelines and criteria. Noise analyses will be based on general information and/or models for noise generation from relevant types of equipment and activities. Impact significance will be evaluated in the context of land use compatibility.

4.0 Controlled Eutrophication Process

One of the most critical objectives in restoring the water quality and beneficial uses of the Salton Sea involves the reduction of nutrient inputs (primarily phosphorus). The Sea is sustained predominantly by drainage from 600,000 acres of irrigated farmland in the Imperial and Coachella Valleys and by wastewater flows from as far south as the Mexicali Valley. These agricultural runoff and municipal wastewater flows contain nutrients that are responsible for the highly eutrophic conditions observed in the Sea, ultimately

resulting in massive fish kills and severe odor problems. To reduce the eutrophic conditions in the Sea, the incoming nutrient loading must be reduced.

4.1 The Process

Nutrients entering the Sea through the three main tributaries (the New, Alamo, and Whitewater Rivers) are present in very dilute concentrations, which are much more difficult to treat than traditional, highly-concentrated wastewater streams such as municipal sewage effluent. Novel, cost-effective techniques for capturing and removing dilute nutrients are required. Beginning in 2002 under a contract from the Salton Sea Authority, Kent SeaTech Corporation and Clemson University in South Carolina made considerable progress in the development of a new nutrient reduction technology called the Controlled Eutrophication Process (CEP). The CEP has shown high potential for removing dilute concentrations of phosphorus and nitrogen from the input flows to the Sea.

The CEP consists of two major treatment steps: 1) the assimilation of nutrients into algal biomass, and 2) the physical removal or harvest of the algal biomass from the water column. The first step is accomplished in well-mixed, high rate algal ponds in which dense populations of single-celled algae are cultured and maintained in a constant state of rapid growth. During this rapid growth phase, the algae are very efficient in assimilating dissolved nutrients from the surrounding water into biomass. The initial CEP development project demonstrated that 85-90% of the phosphorus present in the Whitewater River could be converted into algal biomass. This initial step of the CEP process can be thought of as a nutrient conversion or packaging step, in which dissolved nutrients such as phosphorus and nitrogen are converted into particulate matter (algal cells). The second step is the harvest or removal of the algal cells from the water column. This is the more difficult step in the CEP process, since the individual algal cells are extremely small and have a specific gravity nearly identical to that of water. There have been many attempts to develop technologies for the harvest of single-celled algae from water, most often based on filtration, centrifugation, or settling concepts. However, most of these technologies have proven to be inefficient and/or very expensive, so that they are limited to commercial applications involving high market value products. In our initial CEP studies at the Salton Sea, we developed several novel techniques for removing the algae from the water column that appear to have considerable promise, providing algal removal efficiencies as high as 93%. Phase II of this research is currently underway and is providing additional promising data to indicate that the CEP approach may be a cost-effective solution to the problem of eutrophication in the Salton Sea.

One of the technologies we are developing for algal harvest involves the use of filter-feeding fish to aid in the capture and removal of the algal cells. After exiting the high rate algal ponds (the Algal Treatment Zone), the water and algal cells enter the Primary and Secondary Fish Zones, where large numbers of filter-feeding fish such as tilapia are located. Fish in these Zones receive no other form of feed and will consume large quantities of single-celled algae. A portion of the algae that they consume is converted into fish biomass, and an even larger portion passes through the fish in their waste and is bound together in their fecal chains. The algal biomass is coalesced and bound by these

processes into large dense particles that settle much more easily than individual algal cells. The concentrated, settled algal sludge is lifted up, dewatered, and transported out of the water column using an inclined sedimentation belt algal harvest system developed by Clemson University and Kent SeaTech scientists. A major advantage of this method of removal is that the end product is a thick algal slurry or concentrate that is high in nutrient content and can be used for a variety of fertilizer and biofuel applications.

4.1 Selenium

In addition to removing excess nutrients, the CEP technology may be useful in concentrating and removing selenium from the water input stream. Rapidly growing algae incorporate selenium into algal biomass, so that when the algae are harvested, the selenium is removed from the water column. This aspect of CEP operation may be able to be used to decrease the amount of selenium flowing into the proposed freshwater bird habitats that are part of the PEIR preferred alternative plans. In the opinion of many ecologists, accumulation of selenium in sediments and forage organisms is a significant potential concern that could be serious enough to preclude the implementation of any of the alternative solutions, due to the harm that could be done to wildlife attracted to the shoreline habitat. If CEP treatment systems were located upstream from the existing and proposed wildlife habitats, it is possible that they could be managed to remove sufficient selenium from the waste stream so that the habitats would be safe for use by birds and other wildlife, and perhaps for enhanced fisheries management projects as well.

4.2 Proposed Project

The research and development studies conducted thus far have utilized 12 research-scale CEP units located at Kent SeaTech's fish culture and research facilities adjacent to the Whitewater River at the northern end of the Sea. These small units (75 sq. ft. to 0.7 acres in surface area) have been ideal for the initial, range-finding studies that have been conducted thus far, but the research has now progressed to the point where larger, proof-of-concept scale CEP systems need to be evaluated. Also, there is a need to evaluate the concept using input water from the New River or Alamo River at the southern end of the Sea, which are responsible for 80% of the nutrient inputs to the Sea and have much higher flow rates and more total suspended solids (TSS) than is present in the Whitewater. In addition, there are several aspects of the CEP technology that can only be developed using larger scale evaluation units. These include water velocity, algal removal systems, and the effects of scouring on earthen bottom ponds.

The Salton Sea Authority and Kent SeaTech propose to conduct a proof-of-concept project to further develop and evaluate the CEP technology, on a 25 acre site located on the New or Alamo River. The facility would consist of three or four 5.0 acre CEP units, a small water quality trailer, and associated water delivery and removal pumps and piping. The project will require 3-4 years to complete, at a cost of $5-7 million. The facility and research would be overseen by Kent SeaTech Corporation, with some aspects of the work conducted under subcontract to Clemson University. A performance objective for removal of 70-80% of the total annual phosphorus mass flowing into the CEP units would be utilized to judge the overall technical success of the project. In addition to observations of the nutrient removal rates provided by the CEP, selenium studies would

also be conducted to determine the removal rates possible under various methods of CEP operation. A techno-economic assessment would be conducted to determine the overall cost-effectiveness of the CEP approach in this application.

4.3 Project Outcome and Benefits

The ultimate full-scale implementation of this concept would consist of a series of high rate algal ponds utilizing the CEP technology to reduce phosphorus and nitrogen in the Whitewater, New, and Alamo Rivers, which would significantly reduce the nutrient inputs driving the eutrophic conditions in the Salton Sea. Full-scale implementation of CEP technology for removing 70-80% of the nutrient inputs to the Sea is projected to require approximately 4,000 acres of land. In addition to filter-feeder biomass, the system would produce several valuable byproducts, including marketable fish, energy from the on-site digestion of algae and production of methane, a concentrated algal sludge that could be used as a feed additive or as a slow release agriculture fertilizer, and a concentrated liquid fertilizer high in nitrogen and phosphorus to be returned back to the nearby agriculture fields.

If the CEP technology we are developing can be successfully demonstrated to perform at larger scale, and cost-effective techniques can be developed to interface this promising nutrient reduction technology with other water treatment technologies being proposed for the Salton Sea, the ecological, societal, and financial benefits will be extremely significant. The CEP technology should be able to interface with all of the solutions being proposed to deal with restoration of the Sea. All of the potential solutions will require a cost-effective technique for nutrient reduction if they are to be successful. The Controlled Eutrophication Process offers one of the few water treatment concepts developed thus far that may be able to deal with the large volumes of dilute nutrients that currently flow into the Sea.

5.0 Preliminary Designs

Preliminary design tasks will focus on the following two key components of the Salton Sea:

- The embankments
- The water treatment facilities, either conventional or CEP

The preliminary designs for each of these components are discussed below.

5.1 Preliminary Design of In-Sea Embankments

Conceptual designs of the embankments have been developed. These designs need to be further developed, analyzed, and optimized. The designs will need to be approved by the State's Division of Safety of Dams (DSOD). Key components of the final design will include:

- Foundation preparation/treatment.
- Embankment configuration.
- Embankment materials.

- Seepage control.

The preliminary geotechnical investigations have found that the Seafloor is generally blanketed with very weak soils. Some of the soils are also susceptible to seismically induced liquefaction (loss of strength). These soils will need to be removed and/or treated to support the embankments. The design will focus on minimizing the amount of removal or treatment, while mitigating the risk of embankment failure.

The embankment configuration will be determined by analyses and constructability considerations. The embankment side slope inclinations will be evaluated using static stability analyses, and seismic response analyses. The embankment freeboard height will be determined by performing wave runup analyses. The crest width of the embankment will be determined primarily by constructability considerations.

Suitable gradations of the embankment materials will be determined during final design. The rockfill materials will need to be sufficiently strong to resist seismic liquefaction. Yet minimal crushing and processing is desired to produce the appropriate gradation. The required size and gradation of the riprap will be determined as part of the wave runup analyses. A sand or gravel core may be required in the embankment to facilitate construction of a cutoff wall.

The embankments will have a differential water head on them. Features will need to be incorporated into the embankment design to mitigate seepage problems. This will include a seepage cutoff wall installed through the embankment and along its crest. This will likely be designed and constructed as cement-bentonite slurry wall, embedded into the foundation soils. Features to mitigate the potential for finer grained foundation or embankment soils to pipe into the coarser rockfills will need to be incorporated into the embankment design. This may include granular or geosynthetic filter materials.

The in-Sea embankments will involve unique design and construction. A Board of Senior Consultants (BOSC) will be retained to independently review and critique the design. Value Engineering (VE) sessions will also be conducted by independent teams to optimize the designs. The preliminary designs will be developed and submitted for review at approximately a 30-percent design stage.

5.2 Water Treatment Designs

Nutrients, specifically phosphorus, drive many of the processes that cause most of the aesthetic problems in the sea, including algal blooms, odors, and fish kills. Reduction of nutrient loads entering the Salton Sea from the New and Alamo Rivers, and to a lesser extent the Whitewater River, is a key part of attaining a balanced ecosystem in the lake. An additional component of the water quality plan is to oxidize odor-causing compounds in the Sea using ozone.

Nutrient load reduction will be achieved at multiple points in the system: at the mouth of the rivers, within individual farms, or along the length of the rivers. Control at all of these points may be necessary to achieve the overall load control objective. The processes for nutrient reduction can include both fully-engineered water treatment plants as well as partially engineered natural systems such as treatment wetlands and the controlled eutrophication process.

Odor control is proposed to be performed by pumping of hypolimnetic water during periods of hydrogen sulfide buildup to an above ground facility for water treatment with ozone. The treated water will be discharged into the channel that connects the North Lake with the South Lake.

Preliminary designs will be developed for the different water quality treatment elements. Because of the large flow rates involved in many of the treatment systems, detailed designs will include the operation and performance evaluation of large-scale pilot testing units. An example of such testing exists for the treatment wetlands proposed for construction along the New and Alamo Rivers and on tribal lands near the mouth of the Whitewater River. As part of the design of the network of wetlands, two pilot wetlands with a combined area of more than 100 acres were constructed and monitored for several years. The detailed performance data thus obtained serves as a robust basis for evaluating the costs and benefits of a larger network of wetlands.

5.2.1 Conventional Water Treatment and/or Controlled Eutrophication Processes for Nutrient Removal

Two competing alternatives have been proposed for nutrient (specifically phosphorus) load reduction at the mouth of the New and Alamo Rivers. The first is a conventional chemical treatment plant that works by adding coagulant to the river waters and removes the particulates using settling and/or filtration. The second is a Controlled Eutrophication Process (CEP).

Data on the benefits of coagulation for particulate removal from Salton Sea inflows, in a manner similar to what would be used in a water treatment plant, exist at the bench scale level, based on tests performed with the Support of the Salton Sea Authority. To provide a robust basis for developing a larger scale design, a reasonably large-sized pilot plant (~ 1 mgd) is proposed for operation and performance evaluation for a period of 1-2 years. The pilot testing will provide site-specific information on performance efficiency, chemical doses, energy requirements, discharge water quality, and construction materials that will be used evaluating a larger-scale design. The results from this process will be compared with the results from the CEP pilot project discussed above so that the most coat effective process can be selected for full-scale design.

5.2.2 Ozonation of Hypolimnetic Waters

A small scale pilot test (10 gpm) has been performed to verify whether ozone is effective at removing hydrogen sulfide from the hypolimnetic waters of the Sea. Preliminary cost estimation of this water treatment plant is being performed using information on flow volumes to be treated computed from a water quality model of the Sea. As described above for the water treatment plants and the CEP, larger scale testing (~1 mgd) will be needed to better understand the energy and materials requirements, and the need for special materials for construction given the oxidizing nature of the chemical used.

6.0 Monitoring

Given the major changes likely to occur in the Salton Sea landscape in the coming decades, a coordinated program of water quality, air quality, and wildlife monitoring will be essential for evaluating the impacts of various project components. Many environmental parameters exhibit natural variability, and a reasonably long term data set, pre- and post-project will provide a statistically robust means to quantify project impacts. These monitoring elements are in addition to weather monitoring currently performed around the Salton Sea through CIMIS. Some monitoring described below may already be completed, although often on a project-by-project basis and not necessarily in a coordinated manner. A key recommendation is the development of a systematic monitoring plan that is based on stakeholder input, and includes key parameters of concern over the multi-decade time frame of the restoration.

6.1 Monitoring Plan

A monitoring plan will be developed based on input from various stakeholders including local agencies, scientific experts, and members of the public. The Monitoring Plan will be peer-reviewed, and the data collected as a result will form the basis for evaluating the success of the Salton Sea restoration. A preliminary outline of the parameters to be measured is presented below, however, it is anticipated that this may change because of stakeholder input. A further element to be determined as part of the monitoring plan development, will include the spatial locations of the sampling and the frequency of sampling. The final monitoring plan will include protocols for monitoring activities and maps that identify the specific locations where various monitoring activities will take place.

6.2 Baseline Monitoring Elements

Baseline and, ultimately, long-term monitoring is proposed for water quality in the Sea as well as the rivers that flow into the Sea, for air quality at the shoreline and nearby populated areas, and for wildlife abundance and adverse impacts such as disease and body burdens of toxic chemicals.

Water quality parameters that are proposed for monitoring are identified in Table 2 for Salton Sea and for the freshwater inflows to the Sea.

Table 2: Proposed Elements of Water Quality Monitoring Plan

Salton Sea	Inflows (Alamo, New, and Whitewater Rivers)
Salinity	Volume
Lake level	Nutrients
Temperature and DO profiles	Major anions and cations, suspended solids
Nutrients (Nitrogen and phosphorus)	Toxins (Selenium and pesticides)
Chlorophyll a	Pathogens

Algal bloom frequency	
Sulfide	
Toxins (Selenium and pesticides)	
Major anions and cations, suspended solids	
Pathogens	

Air quality parameters that are recommended for monitoring at the boundary of the Sea and at populated receptor locations include concentrations of suspended particulate matter and odor causing compounds, primarily hydrogen sulfide and ammonia. Monitoring is expected to include characterization of the suspended particulates to determine origin.

Wildlife features recommended for monitoring include the abundance of different bird species, abundance of pupfish species, and characterization of the Salton Sea fishery. Potential adverse impacts such as the incidence of avian disease and body burdens of toxins common in the Salton Sea watershed (primarily selenium and DDT derivatives) will also be monitored. Finally, other factors of interest for human populations, including the abundance of mosquitoes will also be monitored.

7.0 Program Support Functions

A number of key program support functions will be necessary to ensure the successful development and implementation of the Salton Sea Revitalization Plan. Among these will be the following components that will be required essentially for the duration of the project:

- Program administration;
- Public involvement; and
- Land management, including land transfers and acquisitions.

Program administration functions will include general coordination and oversight of the project, management of the procurement processes including preparation and issuance of bid packages and contractor selection, oversight of contractors, solicitation and management of funding, and coordination with other agencies and interested parties. Public involvement will include a full suite of public information and coordination functions including public workshops, news letters and news releases to inform the public of project activities, and email and web-based communications. Land management functions will include coordination of interagency land transfers that may be involved during the project implementation and acquisition of land to be used for project facilities.

USE OF THE CONTROLLED EUTROPHICATION PROCESS IN REDUCING NUTRIENT POLLUTION OF THE SALTON SEA: PHASE 3 - PROOF-OF-CONCEPT EVALUATION

A Proposal Submitted by the Salton Sea Authority and
Prime Contractor Kent SeaTech Corporation

INTRODUCTION

One of the most critical objectives in restoring the water quality and beneficial uses of the Salton Sea involves the reduction of nutrient inputs (primarily phosphorus). The Sea is sustained predominantly by drainage from 600,000 acres of irrigated farmland in the Imperial and Coachella Valleys and by wastewater flows from as far south as the Mexicali Valley. These agricultural runoff and municipal wastewater flows contain nutrients that are responsible for the highly eutrophic conditions observed in the Sea, ultimately resulting in massive fish kills and severe odor problems. To reduce the eutrophic conditions in the Sea, the incoming nutrient loading must be reduced. Currently, none of the methods proposed to stabilize the salinity and water level of the Sea address this serious problem of eutrophication. Even if the proposed methods are successful in creating a smaller, salinity-stable ecosystem, the high levels of nutrients and resulting fish kills and odor problems will continue, unless the nutrient input loading can be reduced.

THE CONTROLLED EUTROPHICATION PROCESS

Nutrients entering the Sea through the three main tributaries (the New, Alamo, and Whitewater Rivers) are present in very dilute concentrations, which are much more difficult to treat than traditional, highly-concentrated wastewater streams such as municipal sewage effluent. Novel, cost-effective techniques for capturing and removing dilute nutrients are required. Beginning in 2002 under a contract from the Salton Sea Authority, Kent SeaTech Corporation and Clemson University in South Carolina made considerable progress in the development of a new nutrient reduction technology called the Controlled Eutrophication Process (CEP). The CEP has shown high potential for removing dilute concentrations of phosphorus and nitrogen from the input flows to the Sea.

The CEP consists of two major treatment steps: 1) the assimilation of nutrients into algal biomass, and 2) the physical removal or harvest of the algal biomass from the water column. The first step is accomplished in well-mixed, high rate algal ponds in which dense populations of single-celled algae are cultured and maintained in a constant state of rapid growth. During this rapid growth phase, the algae are very efficient in assimilating dissolved nutrients from the surrounding water into biomass. The initial CEP development project demonstrated that 85-90% of the phosphorus present in the Whitewater River could be converted into algal biomass. This initial step of the CEP process can be thought of as a nutrient conversion or packaging step, in which dissolved nutrients such as phosphorus and nitrogen are converted into particulate matter (algal cells). The second step is the harvest or removal of the algal cells from the water column. This is the more difficult step in the CEP process, since the individual algal cells are extremely small and have a specific gravity nearly identical to that of water. There have been many attempts to develop technologies for the harvest of single-celled algae from water, most often

based on filtration, centrifugation, or settling concepts. However, most of these technologies have proven to be inefficient and/or very expensive, so that they are limited to commercial applications involving high market value products. In our initial CEP studies at the Salton Sea, we developed several novel techniques for removing the algae from the water column that appear to have considerable promise, providing algal removal efficiencies as high as 93%. Phase II of this research is currently underway and is providing additional promising data to indicate that the CEP approach may be a cost-effective solution to the problem of eutrophication in the Salton Sea.

One of the technologies we are developing for algal harvest involves the use of filter-feeding fish to aid in the capture and removal of the algal cells. After exiting the high rate algal ponds (the Algal Treatment Zone), the water and algal cells enter the Primary and Secondary Fish Zones, where large numbers of filter-feeding fish such as tilapia are located. Fish in these Zones receive no other form of feed and will consume large quantities of single-celled algae. A portion of the algae that they consume is converted into fish biomass, and an even larger portion passes through the fish in their waste and is bound together in their fecal chains. The algal biomass is coalesced and bound by these processes into large dense particles that settle much more easily than individual algal cells. The concentrated, settled algal sludge is lifted up, dewatered, and transported out of the water column using an inclined sedimentation belt algal harvest system developed by Clemson University and Kent SeaTech scientists. A major advantage of this method of removal is that the end product is a thick algal slurry or concentrate that is high in nutrient content and can be used for a variety of fertilizer and biofuel applications.

SELENIUM

In addition to removing excess nutrients, the CEP technology may be useful in concentrating and removing selenium from the water input stream. Rapidly growing algae incorporate selenium into algal biomass, so that when the algae are harvested, the selenium is removed from the water column. This aspect of CEP operation may be able to be used to decrease the amount of selenium flowing into the proposed freshwater bird habitats that are part of the PEIR preferred alternative plans. In the opinion of many ecologists, accumulation of selenium in sediments and forage organisms is a significant potential concern that could be serious enough to preclude the implementation of any of the alternative solutions, due to the harm that could be done to wildlife attracted to the shoreline habitat. If CEP treatment systems were located upstream from the existing and proposed wildlife habitats, it is possible that they could be managed to remove sufficient selenium from the waste stream so that the habitats would be safe for use by birds and other wildlife, and perhaps for enhanced fisheries management projects as well.

PROPOSED PROJECT

The research and development studies conducted thus far have utilized 12 research-scale CEP units located at Kent SeaTech's fish culture and research facilities adjacent to the Whitewater River at the northern end of the Sea. These small units (75 sq. ft. to 0.7 acres in surface area) have been ideal for the initial, range-finding studies that have been conducted thus far, but the research has now progressed to the point where larger, proof-of-concept scale CEP systems need to be evaluated. Also, there is a need to evaluate the concept using input water from the New River or Alamo River at the southern end of the Sea, which are responsible for 80% of the

nutrient inputs to the Sea and have much higher flow rates and more total suspended solids (TSS) than is present in the Whitewater. In addition, there are several aspects of the CEP technology that can only be developed using larger scale evaluation units. These include water velocity, algal removal systems, and the effects of scouring on earthen bottom ponds.

The Salton Sea Authority and Kent SeaTech propose to conduct a proof-of-concept project to further develop and evaluate the CEP technology. A 20 to 40 acre site will be identified adjacent to the New or Alamo River for this evaluation. The facility would consist of three or four 5.0 acre CEP units, a small water quality trailer, and associated water delivery and removal pumps and piping. The project will require 3-4 years to complete, at a cost of $5-7 million. The facility and research would be overseen by Kent SeaTech Corporation, with some aspects of the work conducted under subcontract to Clemson University. A performance objective for removal of 70-80% of the total annual phosphorus mass flowing into the CEP units would be utilized to judge the overall technical success of the project. In addition to observations of the nutrient removal rates provided by the CEP, selenium studies would also be conducted to determine the removal rates possible under various methods of CEP operation. A techno-economic assessment would be conducted to determine the overall cost-effectiveness of the CEP approach in this application.

PROJECT OUTCOME AND BENEFITS

The ultimate full-scale implementation of this concept would consist of a series of high rate algal ponds utilizing the CEP technology to reduce phosphorus and nitrogen in the Whitewater, New, and Alamo Rivers, which would significantly reduce the nutrient inputs driving the eutrophic conditions in the Salton Sea. Full-scale implementation of CEP technology for removing 70-80% of the nutrient inputs to the Sea is projected to require approximately 4,000 acres of land. In addition to filter-feeder biomass, the system would produce several valuable byproducts, including marketable fish, energy from the on-site digestion of algae and production of methane, a concentrated algal sludge that could be used as a feed additive or as a slow release agriculture fertilizer, and a concentrated liquid fertilizer high in nitrogen and phosphorus to be returned back to the nearby agriculture fields.

If the CEP technology we are developing can be successfully demonstrated to perform at larger scale, and cost-effective techniques can be developed to interface this promising nutrient reduction technology with other water treatment technologies being proposed for the Salton Sea, the ecological, societal, and financial benefits will be extremely significant. The CEP technology should be able to interface with all of the solutions being proposed to deal with restoration of the Sea. All of the potential solutions will require a cost-effective technique for nutrient reduction if they are to be successful. The Controlled Eutrophication Process offers one of the few water treatment concepts developed thus far that may be able to deal with the large volumes of dilute nutrients that currently flow into the Sea.

SALTON SEA REVITALIZATION PROGRAM

PHASE 1: FIVE-YEAR WORK PLAN

Prepared by:

The Salton Sea Authority

February 2007

Salton Sea Authority

Contents

1.0 Introduction

The Salton Sea Authority Phase 1: Five-Year Work Program will include the following five key components:

- Environmental Compliance
- Design
- Permitting
- Construction
- Monitoring

The goal of the five year program would be to complete the environmental compliance and permitting processes, prepare detailed designs for the major elements of the Salton Sea Revitalization Plan, start construction on key components, and implement a monitoring program. The key components of the Five-Year Work Program are discussed below.

2.0 Environmental Compliance

The environmental compliance process will include the surveys and other investigations necessary to achieve compliance with the suite of Federal and State environmental regulations that govern major projects in California. Initial tasks will include preparation of environmental compliance documents for the early start habitat area and any pilot projects that are conducted as part of the detailed design process. In conjunction with this activity, preparation can begin on a site-specific Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) which will be prepared in accordance with the requirements for implementing the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), respectively. Other key environmental compliance tasks will include an air conformity analysis in compliance with the Clean Air Act, biological surveys and assessments in accordance with the Endangered Species Act, and cultural resource surveys and Native American consultation to support compliance with the Antiquities Act and other related legislation.

2.1 Early-Start Habitat Environmental Compliance

Environmental compliance for the early start habitat area and any pilot projects that are included in the design phase will include biological and cultural resource surveys and preparation of environmental assessments in compliance with NEPA and Initial Studies in compliance with CEQA. It will be critical to initiate the habitat-related environmental tasks as soon as possible so that they may be completed concurrently with the preparation of detailed design plans for the early start habitat area. Conceptual plans will be needed to complete the environmental documentation tasks. Tasks required to complete the conceptual plans will include site review and screening, aerial imagery, site selection, and preparation of conceptual plan drawings. Detailed design tasks can be prepared while environmental documents are under public and agency review. These tasks will involve topological surveys and preparation of design plans and specifications.

2.2 Site-Specific EIS

The site-specific EIS will be prepared following the Council on Environmental Quality (CEQ) Regulations for Implementing NEPA as well as the State Guidelines for implementing CEQA. In accordance with those regulations, the document will tier from the Programmatic EIR that is currently under preparation by the State. Environmental Setting data from that document will be incorporated and updated as necessary. Other key information will be incorporated by reference. The environmental consequences of the Salton Sea Authority Plan, select alternatives to the Authority Plan, and the No Action Alternative will be evaluated.

2.3 Air Quality Conformance

Section 176(c) of the Clean Air Act requires federal agencies to ensure that actions undertaken in nonattainment or maintenance areas are consistent with the Clean Air Act and with federally enforceable air quality management plans (State Implementation Plans or SIPs). EPA has promulgated separate rules that establish conformity analysis procedures for highway/mass-transit projects (40 CFR Part 93, Subpart A) and for other (general) federal agency actions (40 CFR Part 93, Subpart B). These regulations have been incorporated into the rules and regulations of local and regional air quality management agencies. Certain types of federal agency actions are exempt from conformity rule requirements or are presumed to comply without specific analysis. Types of federal agency actions most commonly subject to the general conformity rule include projects directly undertaken by the agency; the granting of permits, licenses, or other approvals for actions undertaken by other entities; issuing leases for use of federal land; or the funding of actions undertaken by other entities. General conformity requirements are potentially applicable to many federal agency actions, but apply only to those aspects of an action that involve on-going federal agency responsibility and control over direct or indirect sources of air pollutant emissions.

The EPA conformity rule establishes a process that is intended to demonstrate that the proposed federal action:

- would not cause or contribute to new violations of federal air quality standards;
- would not increase the frequency or severity of existing violations of federal air quality standards; and
- would not delay the timely attainment of federal air quality standards.

The EPA general conformity rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emission thresholds that trigger requirements of the conformity rule are called *de minimis* levels. Emissions associated with stationary sources that are subject to permit programs incorporated into the SIP are not counted against the *de minimis* threshold.

Separate *de minimis* thresholds apply to federal agency actions in the Riverside County and Imperial County portions of the Salton Sea Air Basin. Air pollutants subject to

general conformity reviews in the Riverside County portion of the Salton Sea Air Basin include ozone precursors (reactive organic compounds and nitrogen oxides), carbon monoxide, nitrogen dioxide precursors (nitrogen oxides), and suspended particulate matter (PM_{10} and $PM_{2.5}$). Air pollutants subject to general conformity reviews in the Imperial County portion of the Salton Sea Air Basin include ozone precursors (reactive organic compounds and nitrogen oxides) and suspended particulate matter (PM_{10}).

The conformity *de minimis* thresholds in Riverside County are:

- Ozone precursors: 50 tons/year of reactive organic compounds and 50 tons/year of nitrogen oxides;
- Carbon monoxide: 100 tons per year;
- Nitrogen dioxide precursors: 100 tons per year of nitrogen oxides;
- Suspended particulate matter: 70 tons per year of PM10 and 70 tons per year of PM2.5

The conformity *de minimis* thresholds in Imperial County are:

- Ozone precursors: 100 tons/year of reactive organic compounds and 100 tons/year of nitrogen oxides;
- Suspended particulate matter: 100 tons per year of PM10

Emission analyses used in conformity evaluations are more limited than those commonly performed for CEQA and NEPA documents. Only those emission sources subject to an on-going program of federal agency responsibility and control are included in the conformity review. In practice, this often involves an assessment of whether or not the agency has legal authority to establish conditions over different emission sources that will operate subsequent to the agency action. In addition, emissions from facilities that will operate under air quality permits are not included in the conformity review. Actions by different federal agencies are subject to separate conformity reviews. Where multiple federal agencies take action on different aspects of the same project, each federal agency can choose to prepare a separate conformity analysis or can choose to adopt the conformity analysis prepared by another agency. Thus, for a complex project such as the Salton Sea restoration program, there could be multiple independent conformity reviews by different federal agencies for various elements of the overall program. Each separate conformity review would apply the relevant Riverside County and/or Imperial County conformity *de minimis* thresholds to individual federal actions.

Compliance with the conformity rule can be demonstrated in several ways. Compliance is presumed if the net increase in direct and indirect emissions from a federal action would be less than the relevant *de minimis* level. If net emissions increases exceed the relevant *de minimis* value, a formal conformity determination process must be followed. Federal agency actions subject to the general conformity rule cannot proceed until there is a demonstration of consistency with the SIP through one of the following mechanisms:

- By dispersion modeling analyses demonstrating that direct and indirect emissions from the federal action will not cause or contribute to violations of federal ambient air quality standards;
- By showing that direct and indirect emissions from the federal action are specifically identified and accounted for in an approved SIP;
- By showing that direct and indirect emissions associated with the federal agency action are accommodated within emission forecasts contained in an approved SIP;
- By showing that emissions associated with future conditions will not exceed emissions that would occur from a continuation of historical activity levels;
- By arranging emission offsets to fully compensate for the net emissions increase associated with the action;
- By obtaining a commitment from the relevant air quality management agency to amend the SIP to account for direct and indirect emissions from the federal agency action; or
- In the case of regional water or wastewater projects, by showing that any population growth accommodated by such projects is consistent with growth projections used in the applicable SIP.

Dispersion modeling analyses can be used to demonstrate conformity only in the case of primary pollutants such as carbon monoxide or directly emitted PM_{10}. Modeling analyses cannot be used to demonstrate conformity for secondary pollutants such as ozone or photochemically generated particulate matter because the available modeling techniques generally are not sensitive to site-specific emissions.

The simplest approach to ensuring that Clean Air Act conformity can be demonstrated would be for the California Air Resources Board, the South Coast Air Quality Management District (SCAQMD), and the Imperial County Air Pollution Control District (ICAPCD) to formally agree to amend the relevant SIP documents to include emissions associated with the selected Salton Sea restoration program in the emission inventories and forecasts of the SIP documents and to revise the attainment demonstrations accordingly. If state and local agencies do not wish to commit to such SIP amendments, then federal agency actions associated with the Salton Sea restoration program would require separate conformity analyses.

Formal Clean Air Act conformity determinations are subject to public review and comment requirements similar to those required for NEPA documents. Consequently, most federal agencies prefer to include Clean Air Act conformity analyses as part of NEPA documents so that a single public review and comment process can address both the NEPA document and the conformity analysis.

2.4 Endangered Species Act Compliance

The Federal Endangered Species Act of 1973 (ESA) requires that all potential effects, or "take", on listed species be documented and either avoided or compensated for. The ESA defines "take" as any action that may result in harassment, harm, or mortality of any listed species, or actions that cause such species to alter their usual life processes. Generally, this means that the project should be designed to avoid effects on listed species or their habitat. In cases where project objectives cannot be met without causing effects to listed species, the project proponent may receive an incidental take permit, which allows for some take in exchange for mitigation measures designed to compensate for loss of species or habitat.

2.4.1 Biological Surveys

Biological surveys may or may not be needed, depending on the extent of existing information available from past biological surveys, and ongoing biological monitoring programs through the California Department of Fish and Game (CDFG) and the US Fish and Wildlife Service (FWS). Updated biological surveys may be required for some species, in some areas of the sea, and in lands adjacent to the sea that would be directly impacted by the proposed design. Any survey requirements would be identified in the NEPA/CEQA process and during the permitting process, in consultation with CDFG and FWS. Types of surveys that could be required include general biological resource surveys, wetlands and sensitive habitat surveys, and sensitive species surveys. Since some types of surveys can only be performed seasonally, survey requirements need to be identified as early as possible to minimize project delays.

2.4.2 Biological Assessments

A biological assessment (BA) would be required under Section 7 of the ESA due to the presence of listed species within the project area, particularly desert pupfish. A biological assessment describes the projects' potential for "take" of species that are considered candidate, threatened, or endangered under the federal ESA. The biological assessment also describes measures, if any, that the project will incorporate to minimize potential take or to mitigate for unavoidable effects. Once the FWS has reviewed the BA, they will issue either a letter stating concurrence with findings that the project will not result in take, a Biological Opinion stating their opinion of the potential effects and required mitigation measures, or a Jeopardy Opinion, which states their opinion that the project could jeopardize an individual or population of a listed species and that formal consultation is required.

2.4.3 Archaeological Surveys & Compliance

Cultural resources surveys for historic properties/resources and TCPs may or may not be needed, depending on the extent of existing information available from past cultural resources Class I, II, and III surveys. Updated cultural resources surveys may be required in some areas of the sea given that the now submerged lands were once terrestrial and occupied by Native Americans, as well as in lands adjacent to the sea that would be directly or indirectly impacted by the proposed design. Any survey requirements would be identified in the NEPA/CEQA process and in consultation with

BOR archaeologists and the California State Historic Preservation Office (SHPO). Consultations with local federally and State recognized Native Americans to identify Native American resources would occur as part of the NEPA/CEQA process and in consultation with BOR archaeologists, the SHPO, and the California Native American Heritage Commission (NAHC). SHPO and local federally and State recognized Native Americans would be consulted with regarding all surveys and determinations of effect. SHPO concurrence with the determinations of effect would be required prior to committing funds to ground or sea-bottom disturbing activities.

3.0 Permitting

Several permits would be required from a variety of agencies in order to proceed with the proposed project. Permits would be needed for any features of the project that involve the filling of existing wetlands, the disturbance of creek beds, river beds, lake beds or the seabed, the disturbance of more than 0.5 acres of soils on dry land, and the potential for injury, harassment, harm or loss of life of a listed species. Impacts and required permits are detailed in Table 1.

Table 1. Impacts and Required Permits

Impact	Agency	Permit Name
Placement of fill into an existing Water of the US	US Army Corps of Engineers	Section 404 Permit
Placement of structure or structures into a navigable waterway	US Army Corps of Engineers	Section 10 of the Rivers and Harbors Act
Water quality	Regional Water Quality Control Board	Section 401 Water Quality Certification
Disturbance of creek bed, river bed, lake bed or sea bed	California Department of Fish and Game	Section 1602 Streambed Alteration Agreement/Waiver
Disturbance of more than 0.5 acres of soil	State Water Resources Control Board	General Construction Stormwater Permit
Potential for a listed species to be harassed, injured, harmed or killed	US Fish and Wildlife Service	ESA Section 7 Incidental Take Permit
The potential to release air emissions	ICAPCD or SCAQMD	

The length of time required for an agency to process and issue a permit varies greatly, and ample time needs to be allocated to the permit portion of the project. The lead time required to prepare, process, and obtain air quality permits may exceed one year for large and complex facilities, especially if dispersion modeling analyses are required as part of the permit application. ICAPCD and SCAQMD rules provide up to 180 days for agency processing of a permit application once the agency determines that the application is complete. The processing time can be extended in certain circumstances. Air permit applications need to include detailed engineering design information, including identification of equipment manufacturers and model numbers. Thus, the air permit process cannot occur until facility designs are nearly finalized. The Waters of the US Permit (US Army Corps of Engineers) may also be lengthy in terms of timeframe, and has been known to take up to six months. Due to staff shortages and high workload at the FWS, the Section 7 permitting process can take up to a year.

3.1 Features Requiring Permits

Several project features would require their own permits, as detailed below.

3.1.1 Quarries

Quarries would have the potential to disturb more than 0.5 acres of soils, impact air quality through diesel and dust emissions, and impact sensitive species. Permits that may be required as part of quarrying would include:

- General Construction Stormwater Permit;
- Air Permits from ICAPCD or SCAQMD if new quarries are required or if existing quarries are significantly expanded. In addition, fugitive dust control plans would be required;
- ESA Section 7 Incidental Take Permit;
- SHPO concurrence on determinations of effect on cultural resources; and
- Native American consultation for identification of and determination of effect on Native American resources.

3.1.2 Rock Transport and Material Handling Facilities

Construction of rock transport facilities (railcar or conveyor transport systems) and material storage and handling facilities would have the potential to disturb more than 0.5 acres of soils, impact air quality through diesel and dust emissions, and impact sensitive species. Permits that may be required as part of quarrying would include:

- General Construction Stormwater Permit;
- Air Permits from ICAPCD or SCAQMD; fugitive dust control plans would also be required;
- ESA Section 7 Incidental Take Permit;

- SHPO concurrence on determinations of effect on cultural resources; and
- Native American consultation for identification of and determination of effect on Native American resources.

3.1.3 Berthing Facilities

Construction of berthing facilities for barges, tugboats, and other in-water construction equipment would have the potential to disturb more than 0.5 acres of soils, impact air quality through diesel and dust emissions, and impact sensitive species. Permits that may be required as part of quarrying would include:

- General Construction Stormwater Permit;
- Air Permits from ICAPCD or SCAQMD; fugitive dust control plans would also be required;
- ESA Section 7 Incidental Take Permit;
- Section 404 Waters of the US Permit;
- SHPO concurrence on determinations of effect on cultural resources; and
- Native American consultation for identification of and determination of effect on Native American resources.

3.1.4 Embankments and Dams

Embankments would have the potential to disturb more than 0.5 acres of soils, impact air quality through diesel and dust emissions, impact sensitive species, and involve fill in Waters of the US. Permits that may be required as part of constructing embankments would include:

- General Construction Stormwater Permit;
- Riverside County Air Permit;
- ESA Section 7 Incidental Take Permit;
- Section 404 Waters of the US Permit; and
- Section 401 Water Quality Certification

3.1.5 Habitat areas

Habitat areas would have the potential to disturb more than 0.5 acres of soils, impact air quality through diesel and dust emissions, impact sensitive species, and involve fill in Waters of the US. Permits that may be required as part of constructing habitat areas would include:

- General Construction Stormwater Permit;
- Riverside County Air Permit;
- Fugitive Dust Control Plans;

- ESA Section 7 Incidental Take Permit;
- Section 404 Waters of the US Permit;
- Section 401 Water Quality Certification;
- SHPO concurrence on determinations of effect on cultural resources; and
- Native American consultation for identification of and determination of effect on Native American resources.

3.1.6 Water Treatment Facilities

Construction of water treatment facilities would have the potential to disturb more than 0.5 acres of soils, impact air quality through diesel and dust emissions, impact sensitive species, and involve fill in Waters of the US. Permits that may be required as part of constructing and operating water treatment facilities would include:

- General Construction Stormwater Permit;
- Air Permits from ICAPCD or SCAQMD;
- ESA Section 7 Incidental Take Permit;
- Section 404 Waters of the US Permit;
- Section 401 Water Quality Certification;
- SHPO concurrence on determinations of effect on cultural resources; and
- Native American consultation for identification of and determination of effect on Native American resources.

3.1.7 Wetlands

Wetland projects would have the potential to disturb land areas, impact air quality through diesel and dust emissions, impact sensitive species, and involve fill in Waters of the US. Permits that may be required as part of constructing wetlands would include:

- General Construction Stormwater Permit;
- Fugitive Dust Control Plans;
- Air Permits from ICAPCD or SCAQMD;
- ESA Section 7 Incidental Take Permit;
- Section 404 Waters of the US Permit;
- Section 401 Water Quality Certification;
- SHPO concurrence on determinations of effect on cultural resources; and
- Native American consultation for identification of and determination of effect on Native American resources.

4.0 Detailed Designs

The design tasks will include field investigations as well as computer modeling and other analytical processes leading to final plans and specifications for the various structural components of the Salton Sea Authority Plan. Field work will include both in-Sea and on-land geotechnical investigations to determine foundation conditions for in-sea embankments, water treatment facilities, wetlands and other features as well as rock characteristics at potential quarry sites. The first phase will involve further development of conceptual designs to finalize design approaches. Following the completion of the conceptual design phase, design plans will be prepared and submitted for review at the 30-, 60- and 90-percent design stages. Upon final review and sign-off of 90 percent drawings, final design plans and specifications will be prepared. Multiple bid packages will be prepared so that separate awards can be made for different components of the program. This will allow multiple contractors to work simultaneously to complete different features and will streamline the process and speed up the time when the project will be fully operational. Upon completion of construction of each component, as-built plans will be prepared for all facilities.

4.1 Detailed Geotechnical Investigations

The Salton Sea Revitalization Plan will require extensive earthwork and construction. A primary feature of the construction will be over 33 miles of in-Sea embankments to form the lakes and waterways. Preliminary geotechnical investigations have been performed at several locations proposed for the embankments; however, these investigations were limited in scope, given the scale of the embankments. Detailed subsurface characterization will be needed to interpret and quantify the geological variability that exists in the Salton Sea.

The preliminary investigations included both drilled and sampled borings, and cone penetrations tests (CPTs), performed using drill and CPT rigs supported on a jackup barge. Similar exploration methods would be used for the detailed geotechnical investigations. However, multiple rigs would be mobilized, and jackup barges capable of working in the maximum water depths would be required.

There are several critical components for the embankment design that will be required for the final design. These include:

- Depths of overexcavation of the weak foundation soils.
- Characteristics of the soils to be excavated/dredged.
- Strengths of the foundation soils
- Potential for the foundation soils to liquefy during an earthquake.
- Seepage characteristics of the foundation soils.

It is planned to perform subsurface explorations along proposed embankment alignments at about a 500- to 1000- foot spacing longitudinally. A series of explorations will also be performed along several sections transverse to the embankment alignment to evaluate the variability of conditions across the embankment width. Characteristics of

the subbottom soils will be determined using in-situ testing (e.g. CPTs), and laboratory testing on samples recovered from the explorations.

The detailed geotechnical investigation will also evaluate the seismic hazards for the project. These will include earthquake induced ground motions, possible locations of faults, and potential and height of seiche waves (earthquake induced waves). Deterministic and probabilistic methods will be used to determine the ground motions, and potential for seiches. Marine geophysical surveys will be used to evaluate the potential locations of earthquake faults that may project across embankment locations. The geophysical surveys will also provide cost-effective spatial interpretations between boring or CPT locations.

The constructability of the in-Sea embankments will be evaluated by undertaking trial excavations and embankments. These trials will be used to evaluate the dredgability of the weak soils, the stable inclinations of the overexcavations, the techniques and equipment required to construct the embankments below water, and the impact of the harsh environment at the Sea. The trial embankments will be constructed using both marine and land based equipment.

It is anticipated that the embankments will be constructed using rockfill from a quarry developed near the Sea. It is estimated that over 60 million cubic yards of rockfill will be required. Riprap will be used to armor and protect the embankments from erosion. An investigation is currently underway to evaluate a potential quarry site near Coolidge Mountain, located about 4 miles west of Salton Sea Beach, near the northwest end of the Sea. This site had previously been explored for mineral exploitation. Additional explorations there, or at another site selected for the quarry, focused on evaluating the suitability of the material for rockfill will be required. The investigation will consist of cored borings with subsequent laboratory testing on the cored materials. A trial quarry is also proposed at the selected quarry site. This trial quarry will be used to evaluate the blasting and processing requirements to produce the selected gradations for the rockfill and riprap.

Water treatment and conveyance facilities will also be constructed. Extensive earthwork will also be required to construct the Saline Habitat Complex. Geotechnical investigations will be undertaken at the locations of these facilities to determine the earthwork and foundation design requirements.

The results of the geotechnical investigations will be presented in Geotechnical Data Reports. Information for design of the embankments and other facilities will be presented in Geotechnical Interpretive Reports.

4.2 Design of In-Sea Embankments

Conceptual designs of the embankments have been developed. These designs need to be further developed, analyzed, and optimized. The designs will need to be approved by the State's Division of Safety of Dams (DSOD). Key components of the final design will include:

- Foundation preparation/treatment.
- Embankment configuration.

- Embankment materials.
- Seepage control.

The preliminary geotechnical investigations have found that the Seafloor is generally blanketed with very weak soils. Some of the soils are also susceptible to seismically induced liquefaction (loss of strength). These soils will need to be removed and/or treated to support the embankments. The design will focus on minimizing the amount of removal or treatment, while mitigating the risk of embankment failure.

The embankment configuration will be determined by analyses and constructability considerations. The embankment side slope inclinations will be evaluated using static stability analyses, and seismic response analyses. The embankment freeboard height will be determined by performing wave runup analyses. The crest width of the embankment will be determined primarily by constructability considerations.

Suitable gradations of the embankment materials will be determined during final design. The rockfill materials will need to be sufficiently strong to resist seismic liquefaction. Yet minimal crushing and processing is desired to produce the appropriate gradation. The required size and gradation of the riprap will be determined as part of the wave runup analyses. A sand or gravel core may be required in the embankment to facilitate construction of a cutoff wall.

The embankments will have a differential water head on them. Features will need to be incorporated into the embankment design to mitigate seepage problems. This will include a seepage cutoff wall installed through the embankment and along its crest. This will likely be designed and constructed as cement-bentonite slurry wall, embedded into the foundation soils. Features to mitigate the potential for finer grained foundation or embankment soils to pipe into the coarser rockfills will need to be incorporated into the embankment design. This may include granular or geosynthetic filter materials.

The in-Sea embankments will involve unique design and construction. A Board of Senior Consultants (BOSC) will be retained to independently review and critique the design. Value Engineering (VE) sessions will also be conducted by independent teams to optimize the designs. The designs will be developed and submitted for review at the 30-, 60- and 90-percent design stages. Plans and specifications will be prepared as construction bidding documents. Multiple bid packages will be prepared so that separate awards can be made for various components of the program.

4.3 Water Treatment Designs

Nutrients, specifically phosphorus, drive many of the processes that cause most of the aesthetic problems in the sea, including algal blooms, odors, and fish kills. Reduction of nutrient loads entering the Salton Sea from the New and Alamo Rivers, and to a lesser extent the Whitewater River, is a key part of attaining a balanced ecosystem in the lake. An additional component of the water quality plan is to oxidize odor-causing compounds in the Sea using ozone.

Nutrient load reduction will be achieved at multiple points in the system: at the mouth of the rivers, within individual farms, or along the length of the rivers. Control at all of these points may be necessary to achieve the overall load control objective. The

processes for nutrient reduction can include both fully-engineered water treatment plants as well as partially engineered natural systems such as treatment wetlands and the controlled eutrophication process.

Odor control is proposed to be performed by pumping of hypolimnetic water during periods of hydrogen sulfide buildup to an above ground facility for water treatment with ozone. The treated water will be discharged into the channel that connects the North Lake with the South Lake.

Over the next five years, detailed designs will be developed for the different water quality treatment elements. Because of the large flow rates involved in many of the treatment systems, detailed designs will include the operation and performance evaluation of large-scale pilot testing units. An example of such testing exists for the treatment wetlands proposed for construction along the New and Alamo Rivers and on tribal lands near the mouth of the Whitewater River. As part of the design of the network of wetlands, two pilot wetlands with a combined area of more than 100 acres were constructed and monitored for several years. The detailed performance data thus obtained serves as a robust basis for evaluating the costs and benefits of a larger network of wetlands.

4.3.1 Conventional Water Treatment and/or Controlled Eutrophication Processes for Nutrient Removal

Two competing alternatives have been proposed for nutrient (specifically phosphorus) load reduction at the mouth of the New and Alamo Rivers. The first is a conventional chemical treatment plant that works by adding coagulant to the river waters and removes the particulates using settling and/or filtration. The second is a Controlled Eutrophication Process (CEP) that promotes the growth of algae that sequester phosphorus. The algae flocs, and therefore the nutrients associated with them, are separated from the inflows resulting in improved water quality.

Data on the benefits of coagulation for particulate removal from Salton Sea inflows, in a manner similar to what would be used in a water treatment plant, exist at the bench scale level, based on tests performed with the Support of the Salton Sea Authority. To provide a robust basis for developing a larger scale design, a reasonably large-sized pilot plant (~ 1 mgd) is proposed for operation and performance evaluation for a period of 1-2 years. The pilot testing will provide site-specific information on performance efficiency, chemical doses, energy requirements, discharge water quality, and construction materials that will be used evaluating a larger-scale design.

The CEP has been implemented and has demonstrated for Salton Sea inflows at a small scale. The research and development studies conducted thus far have utilized 12 research-scale CEP units located at Kent SeaTech's fish culture and research facilities adjacent to the Whitewater River at the northern end of the Sea. These small units (75 sq. ft. to 0.7 acres in surface area) have been ideal for the initial, range-finding studies that have been conducted thus far, but the research has now progressed to the point where larger, proof-of-concept scale CEP systems need to be evaluated. Also,

there is a need to evaluate the concept using input water from the New River or Alamo River at the southern end of the Sea, which are responsible for 80% of the nutrient inputs to the Sea and have much higher flow rates and more total suspended solids (TSS) than is present in the Whitewater. In addition, there are several aspects of the CEP technology that can only be developed using larger scale evaluation units. These include water velocity, algal removal systems, and the effects of scouring on earthen bottom ponds.

The Salton Sea Authority and Kent SeaTech propose to conduct a proof-of-concept project to further develop and evaluate the CEP technology, on a 25 acre site located on the New or Alamo River. The facility would consist of three or four 5.0 acre CEP units, a small water quality trailer, and associated water delivery and removal pumps and piping. The project will require 3-4 years to complete, at a cost of $5-7 million. The facility and research would be overseen by Kent SeaTech Corporation, with some aspects of the work conducted under subcontract to Clemson University. A performance objective for removal of 70-80% of the total annual phosphorus mass flowing into the CEP units would be utilized to judge the overall technical success of the project. In addition to observations of the nutrient removal rates provided by the CEP, selenium studies would also be conducted to determine the removal rates possible under various methods of CEP operation. A techno-economic assessment would be conducted to determine the overall cost-effectiveness of the CEP approach in this application.

4.3.2 Ozonation of Hypolimnetic Waters

A small scale pilot test (10 gpm) has been performed to verify whether ozone is effective at removing hydrogen sulfide from the hypolimnetic waters of the Sea. Preliminary cost estimation of this water treatment plant is being performed using information on flow volumes to be treated computed from a water quality model of the Sea. As described above for the water treatment plants and the CEP, larger scale testing (~1 mgd) will be needed to better understand the energy and materials requirements, and the need for special materials for construction given the oxidizing nature of the chemical used.

4.3.3 Wetland Designs

A considerable amount of work has been performed in understanding performance of wetlands using the pilot wetlands constructed at Imperial and Brawley and the wetlands constructed on tribal lands near the mouth of the Whitewater River. Several agencies have cooperatively funded this work including the US EPA and the Bureau of Reclamation. It is estimated that about $4-6 million have been spent in the design, construction, monitoring, and performance evaluation of the Imperial and Brawley pilot wetlands. These wetlands have provided information on removal of nutrients and other contaminants, as well as data on the potential bioaccumulation of toxins such as selenium that might limit the applicability of this approach in the Salton Sea region. The wetland plan currently calls for the construction of 30-40 individual wetlands along the New, Alamo and Whitewater Rivers. The next step in this process is the development of detailed designs for each of the wetlands at proposed sites. Detailed designs include

evaluation of flow configuration, earth movement, and habitat requirements. A further step is the evaluation of the need for additional wetlands beyond those currently being planned.

4.3.4 On-Farm TMDL Controls

A significant fraction of the phosphorus that reaches the Salton Sea originates as fertilizer applied on agricultural land in the watershed. Better management of fertilizer application, including timing and quantity of delivery, and management of tailwater from farms has the potential to reduce the loads to the flowing into the agricultural drains and into the Salton Sea. These best management practices (BMPs) have demonstrated effectiveness at reducing phosphorus loads from large basins. In the Everglades restoration, for example, BMPs were shown to be effective at reducing farm runoff loads of phosphorus by more than 50%. A BMP program will be implemented in the Imperial and Coachella Valleys with the assistance of local agencies such as the Imperial County Farm Bureau. Where such programs are already in place, this work will provide additional technical support such as active monitoring of drainwater quality at the individual farm drain level to evaluate the benefits of various practices. BMPs that are found to be especially effective at curtailing phosphorus loads from farms may be identified for more widespread application.

4.4 Habitat Features

Designs for habitat features will be prepared in multiple phases. The initial phase will involve preparation of plans and specifications for the early start areas. Conceptual plans will be needed to complete the environmental documentation tasks. Tasks required to complete the conceptual plans will include site review and screening, aerial imagery, site selection, and preparation of conceptual plan drawings. Detailed design tasks can be prepared while environmental documents are under public and agency review. These tasks will involve topological surveys and preparation of design plans and specifications.

5.0 Construction Starts

5.1 Wetlands

Construction of an individual wetland of 100-500 acres could be completed over a time frame of months, based on prior experience in the Imperial Valley and on tribal lands at the north end of the Sea. Given the distributed nature of the proposed wetlands, construction of a set of these can begin in 2009. Locations that produce the greatest benefit have been identified in current plan development.

5.2 Early start saline habitat complex

Construction can begin on the early start area as soon as the environmental compliance and design tasks are completed. The timeframe for construction will depend on the amount of land that is included within the early start footprint and whether an on-land or in-Sea area is selected for the early start, or some combination. If the area is within

several thousand acres, it should be possible to complete construction in a six-month timeframe.

5.3 Water Treatment Facilities

Construction starts on treatment facilities would depend on the specific designs that are developed during the planning and design tasks. It is expected that design and construction of water treatment facilities would be modular so that initial phases could be smaller and additional units could be added as needed.

5.4 Embankments

It is expected that the initial construction on the embankments would start in the south. The embankments could be designed in three phases: (1) the southern dike enclosing the south lake area, (2) the dike along the western shore, and (3) the dike across the central part of the current Sea. If initial funding is limited, the dike in the south could be closed as a southern area lake that could be operated on a stand-alone basis until funding could be secured for the other phases. As additional funding becomes available, embankment construction would extend northward and then across the central portion of the current Sea to complete the plan.

6.0 Monitoring

Given the major changes likely to occur in the Salton Sea landscape in the coming decades, a coordinated program of water quality, air quality, and wildlife monitoring will be essential for evaluating the impacts of various project components. Many environmental parameters exhibit natural variability, and a reasonably long term data set, pre- and post-project will provide a statistically robust means to quantify project impacts. These monitoring elements are in addition to weather monitoring currently performed around the Salton Sea through CIMIS. Some monitoring described below may already be completed, although often on a project-by-project basis and not necessarily in a coordinated manner. A key recommendation is the development of a systematic monitoring plan that is based on stakeholder input, and includes key parameters of concern over the multi-decade time frame of the restoration.

6.1 Monitoring Plan

A monitoring plan will be developed based on input from various stakeholders including local agencies, scientific experts, and members of the public. The Monitoring Plan will be peer-reviewed, and the data collected as a result will form the basis for evaluating the success of the Salton Sea restoration. A preliminary outline of the parameters to be measured is presented below, however, it is anticipated that this may change because of stakeholder input. A further element to be determined as part of the monitoring plan development includes the spatial locations of the sampling and the frequency of sampling.

6.2 Monitoring Elements (Baseline and Long-Term)

Baseline and long-term monitoring is proposed for water quality in the Sea as well as the rivers that flow into the Sea, for air quality at the shoreline and nearby populated

areas, and for wildlife abundance and adverse impacts such as disease and body burdens of toxic chemicals.

Water quality parameters that are proposed for monitoring are identified in Table 2 for Salton Sea and for the freshwater inflows to the Sea.

Table 2: Proposed Elements of Water Quality Monitoring Plan

Salton Sea	Inflows (Alamo, New, and Whitewater Rivers)
Salinity	Volume
Lake level	Nutrients
Temperature and DO profiles	Major anions and cations, suspended solids
Nutrients (Nitrogen and phosphorus)	Toxins (Selenium and pesticides)
Chlorophyll a	Pathogens
Algal bloom frequency	
Sulfide	
Toxins (Selenium and pesticides)	
Major anions and cations, suspended solids	
Pathogens	

Air quality parameters that are recommended for monitoring at the boundary of the Sea and at populated receptor locations include concentrations of suspended particulate matter and odor causing compounds, primarily hydrogen sulfide and ammonia. Monitoring is expected to include characterization of the suspended particulates to determine origin.

Wildlife features recommended for monitoring include the abundance of different bird species, abundance of pupfish species, and characterization of the Salton Sea fishery. Potential adverse impacts such as the incidence of avian disease and body burdens of toxins common in the Salton Sea watershed (primarily selenium and DDT derivatives) will also be monitored. Finally, other factors of interest for human populations, including the abundance of mosquitoes will also be monitored.

7.0 Program Support Functions

A number of key program support functions will be necessary to ensure the successful development and implementation of the Salton Sea Revitalization Plan. Among these will be the following components that will be required essentially for the duration of the project:

- Program administration;
- Public involvement; and

- Land management, including land transfers and acquisitions.

Program administration functions will include general coordination and oversight of the project, management of the procurement processes including preparation and issuance of bid packages and contractor selection, oversight of contractors, solicitation and management of funding, and coordination with other agencies and interested parties. Public involvement will include a full suite of public information and coordination functions including public workshops, news letters and news releases to inform the public of project activities, and email and web-based communications. Land management functions will include coordination of interagency land transfers that may be involved during the project implementation and acquisition of land to be used for project facilities.

8.0 Schedule and Budget Phasing Plan

A preliminary master schedule and budget estimate phasing plan is provided on the following page. The phasing plan illustrates the sequence of major tasks discussed in this document that are needed to implement the Salton Sea Authority's revitalization program for the Salton Sea.

Salton Sea Authority 5-Year Work Plan

Projected Funding Requirements and Timeline for Phase 1 Implementation

		Fiscal Year				
Work Element	**Cost**	**2008**	**2009**	**2010**	**2011**	**2012**
Environmental Compliance						
EA & Initial Study for Early-Start Habitat	$ 1	$1				
Site-specific EIR/EIS	$ 6	$3	$3			
Air quality conformance	$ 8	$2	$2	$2	$2	
Endangered Species Act Compliance	$ 8	$2	$2	$2	$2	
o Biological surveys						
o Biological Assessment						
Archaeological surveys & compliance	$ 4	$1	$2	$1		
Detailed Designs						
Detailed geotechnical investigations	$ 50	$10	$20	$20		
Structural designs of in-Sea embankments	$ 35	$5	$10	$10	$10	
Treatment designs	$ 35	$5	$10	$10	$10	
o Conventional and/or CEP						
o Wetlands						
o On-farm TMDL controls						
Habitat features	$ 15	$5	$5	$5		
o Early start saline habitat complex	$ -					
Wetlands	$ 35	$5	$10	$10	$10	
Permitting	$ -					
Quarries	$ 6		$2	$2	$2	
Embankments	$ 6		$2	$2	$2	
Habitat areas	$ 6		$2	$2	$2	
Water treatment facilities	$ 6		$2	$2	$2	
Wetlands	$ 6		$2	$2	$2	
Construction Starts						
Wetlands	$ 80		$20	$20	$20	$20
Early start saline habitat complex	$ 100	$10	$25	$25	$25	$15
Water treatment facilities	$ 320				$120	$200
Embankments	$ 260					$260
o Start construction on south embankment	$ -					
Environmental Monitoring						
Prepare monitoring plan	$ 2	$2				
Baseline monitoring	$ 6		$2	$2	$2	
Long-term monitoring	$ 5				$2	$3
Program Support Functions						
Program administration	$ -					
Land transfers and acquisitions	$ -					
Public involvement	$ -					
Total Project ($M)	**$ 1,000**	**$51**	**$121**	**$117**	**$213**	**$498**

RESOLUTION NO. _____

A RESOLUTION OF THE THERMAL COMMUNITY COUNCIL SUPPORTING THE SALTON SEA AUTHORITY PLAN FOR MULTI-PURPOSE PROJECT

THE THERMAL COMMUNITY COUNCIL OF THE COUNTY OF RIVERSIDE DOES HEREBY RESOLVE AS FOLLOWS:

WHEREAS, the Salton Sea Authority is a Joint Powers Agency formed under the laws of the State of California by a Joint Powers Agreement dated 1993, and is the regional agency for identifying and implementing corrective measures to preserve the beneficial uses of the Sea; and

WHEREAS, the Salton Sea Authority has conducted extensive research and scientific investigation of the Salton Sea and has studied numerous alternative measures to restore and revitalize the Sea, and

WHEREAS, on June 29, 2006, the Board of Directors of the Salton Sea Authority voted unanimously to adopt the Executive Summary of the Salton Sea Authority Conceptual Plan; and

WHEREAS, The Thermal Community Council finds that the Salton Sea Authority Conceptual Plan best meets the needs to provide wildlife habitats, improve water quality, and protect air quality in our region; and

WHEREAS, the Salton Sea Conceptual Plan also creates major recreational and economic development opportunities in the Coachella and Imperial Valleys; and

WHEREAS, the Salton Sea Authority Conceptual Plan best meets the needs of the Thermal Community Council, its constituents, and those living and working in the Coachella and Imperial Valleys; and

WHEREAS, the Salton Sea Authority Conceptual Plan is superior to other alternatives that the State of California and the U.S. Department of Interior, Bureau of Reclamation, are considering during their programmatic EIR and alternatives study; and

WHEREAS, prior to the formal adopting or implementation of any restoration plan, the Salton Sea Authority will cause any project to undergo a

thorough and environmental analysis pursuant to the California Environmental Quality Act.

NOW, THEREFORE, BE IT RESOLVED by the Thermal Community Council of the County of Riverside as follows:

1. The Thermal Community Council hereby supports the "Salton Sea Authority Conceptual Plan for Multi-Purpose Project" as the preferred plan for restoration and revitalization of the Salton Sea; and
2. The Thermal Community Council encourages the State of California and the Department of Interior to select the Salton Sea Authority Conceptual Plan as their preferred alternative for Salton Sea restoration and revitalization; and
3. The Thermal Community Council encourages cities and counties and other entities to join with it in support of the Salton Sea Authority Conceptual Plan.

PASSED, APPROVED, AND ADOPTED by

UNANIMOUS VOTE this 22 day of JANUARY, 2007.

Mike Wells, Chairman
Thermal Community Council
County of Riverside

Desert Alliance for Community Empowerment
Desert Communities Empowerment Zone
53-990 Enterprise Way, Suite 1, Coachella, CA 92236
(760) 391-5050 Fax: (760) 391-5100
Toll Free (866) 266-DACE (3223)

"EMPOWERING RESIDENTS-SUSTAINING RURAL COMMUNITIES"

RECEIVED
JAN 24 2007
By

January 8th, 2007

Mr. Rick Daniels
Salton Sea Authority
78-401 Highway 111, Suite T
La Quinta, CA 92253

Dear Mr. Daniels,

Desert Alliance for Community Empowerment (DACE), a 501 (c) (3) non-profit organization managing the Desert Communities Empowerment Zone (DCEZ), hereby acknowledges its enthusiastic support of the Salton Sea Authority's locally-developed conceptual plan for the Salton Sea and its surrounding area titled "*Salton Sea Authority Conceptual Plan for Multi-Purpose Project.*"

The DCEZ, which encompasses the northern area of the Salton Sea and its surrounding communities, was established in 1999 as initially one of ten federally designate rural empowerment zones. Stretching for over 4,200 square miles along the eastern Riverside County, DCEZ strives to provide its residents and communities with the means, resources, and opportunities to achieve a quality lifestyle that is both self-sufficient and sustainable. DACE aims to achieve its goal by addressing 1) capacity building, 2) community development, 3) economic development, 4) education, 5) health/human services, and 6) housing.

As California's largest body of water, the Salton Sea and its splendor can only be matched by its potential as articulated within the Salton Sea Authority's conceptual plan. The plan will foster ecosystem restoration, regional economic growth, and provide recreational opportunities – all vital components of a quality lifestyle for the residents of the DCEZ. As an adjacent land owner and regional economic development corporation, DACE recognizes the sustained economic benefits the proposed development will bring to an area that for years has remained economically stagnant. In addition, the plan will address the Salton Sea's insidious threat to our region's air quality if any of the sea's lake-bed is exposed. Therefore, the economic and environmental health of the DCEZ depends on and will thus benefit if the Salton Sea Authority's plan comes to fruition.

DACE, having collaborated numerous times with the various agencies and individuals which comprise the Salton Sea Authority, salutes the agency's efforts to revitalize and restore the Salton Sea as well as its surrounding area. As a result - assuming all environmental and community concerns are adequately met – DACE wholeheartedly endorses the Salton Sea Authority's "*Salton Sea Authority Conceptual Plan for Multi-Purpose Project.*"

Sincerely,

JEFFREY A. HAYS
Executive Director

DACE is Equal Opportunity Provider

Serving: Desert Center, Colorado River Communities, Mecca, Mesa Verde, North Shore, Oasis, Ripley, Thermal, Cabazon Band of Mission Indians, Torres Martinez Desert Cahuilla Indians

RANCHO
Housing Alliance Inc.

53-990 Enterprise Way, Suite 1,
Coachella, CA 92236
(760) 391-5050
Toll Free (866) 266-3223
Fax: (760) 391-5100

January 8th, 2007

Mr. Rick Daniels
Salton Sea Authority
78-401 Highway 111, Suite T
La Quinta, CA 92253

Dear Mr. Daniels,

Rancho Housing Alliance, Inc., a subsidiary of Desert Alliance for Community Empowerment (DACE), hereby acknowledges its enthusiastic support of the Salton Sea Authority's locally-developed conceptual plan for the Salton Sea and its surrounding area titled "*Salton Sea Authority Conceptual Plan for Multi-Purpose Project*" while urging the authority to consider the devastating dearth of affordable housing within the federally-designated Desert Community Empowerment Zone (DCEZ)

Rancho Housing Alliance, Inc. was incorporated in 2001 in efforts to provide residents and the communities of eastern Riverside County with the means and resources for quality and affordable housing. Rancho Housing Alliance, Inc. aims to achieve its goal by developing and constructing affordable single-family and manufactured housing, by providing qualified families with the resources and information they need to achieve home ownership, and by providing residents with the information, assistance, and resources necessary to assess their current and future housing needs.

As California's largest body of water, the Salton Sea and its splendor can only be matched by its potential as articulated within the Salton Sea Authority's conceptual plan. The plan will foster ecosystem restoration, regional economic growth, and provide recreational opportunities for current and future residents alike. In fact, the communities surrounding the Salton Sea are facing rapid growth as the demand for affordable housing migrates families to these rural areas.

It is imperative that the Salton Sea Authority and its conceptual plan both recognize and address the housing needs of people currently inhabiting and those moving to the surrounding area. Currently, Rancho Housing Alliance, Inc. is constructing new housing in these communities to assist more than 2,000 very-low and low income residents who are interested in home ownership and have no options elsewhere. Therefore, the plan should empower the current communities by providing suitable and affordable housing opportunities.

Rancho Housing Alliance, Inc. has collaborated with the various agencies and individuals which comprise the Salton Sea Authority and salutes the agency's efforts to revitalize and restore the Salton Sea and its surrounding areas. As a result, Rancho Housing Alliance, Inc. remains confident that the Salton Sea Authority will act in the best interest of DCEZ inhabitants and thus wholeheartedly endorses the "*Salton Sea Authority Conceptual Plan for Multi-Purpose Project.*"

Sincerely,

JEFFREY A. HAYS
Executive Director

RANCHO HOUSING ALLIANCE IS A EQUAL OPPORTUNITY PROVIDER
SERVING EASTERN RIVERSIDE COUNTY

RESOLUTION NO. _____

A RESOLUTION OF THE PALM SPRINGS DESERT RESORTS CONVENTION AND VISITORS AUTHORITY SUPPORTING THE SALTON SEA AUTHORITY CONCEPTUAL PLAN

WHEREAS, the Salton Sea Authority is a Joint Powers Agency formed under the laws of the State of California by a Joint Powers Agreement dated 1993, and is the regional agency for identifying and implementing corrective measures to preserve the beneficial uses of the Sea; and

WHEREAS, the Salton Sea Authority has conducted extensive research and scientific investigation of the Salton Sea and has studied numerous alternative measures to restore and revitalize the Sea to protect wildlife, protect air quality, improve water quality and create economic development opportunities; and

WHEREAS, on June 29, 2006, the Board of Directors of the Salton Sea Authority voted unanimously to adopt the Executive Summary of the Salton Sea Authority Conceptual Plan; and

WHEREAS, The Palm Springs Desert Resorts Convention And Visitors Authority finds that the Salton Sea Authority Conceptual Plan best meets the needs to provide wildlife habitats, improve water quality, and protect air quality in our region in such a manner as to protect the region's tourism industry; and

WHEREAS, the Salton Sea Conceptual Plan also creates major recreational and economic development opportunities in the Coachella and Imperial Valleys; and

WHEREAS, the Salton Sea Authority Conceptual Plan is superior to other alternatives that the State of California and the U.S. Department of Interior, Bureau of Reclamation, are considering during their programmatic EIR and alternatives study; and

WHEREAS, prior to the formal adoption or implementation of any restoration plan, the Salton Sea Authority will cause any project to undergo a thorough environmental analysis pursuant to the California Environmental Quality Act.

NOW, THEREFORE, BE IT RESOLVED by The Palm Springs Desert Resorts Convention And Visitors Authority as follows:

1. The Palm Springs Desert Resorts Convention And Visitors Authority hereby supports the "Salton Sea Authority Conceptual Plan for Multi-Purpose Project" as the preferred plan for restoration and revitalization of the Salton Sea; and
2. The Palm Springs Desert Resorts Convention and Visitors Authority encourages the State of California and the Department of Interior to select the Salton Sea Authority Conceptual Plan as their preferred alternative for Salton Sea restoration and revitalization; and
3. The Palm Springs Desert Resorts Convention and Visitors Authority encourages cities and counties and other entities to join with it in support of the Salton Sea Authority Conceptual Plan.

PASSED, APPROVED, AND ADOPTED by

_____ this ____ day of _____, 2007.

CITY OF RANCHO MIRAGE

January 25, 2007

Mr. Rick Daniels
Executive Director
SALTON SEA AUTHORITY
78401 Highway 111
La Quinta, CA 92253

Dear Mr. Daniels:

In recognition of the important benefit of restoring the Salton Sea to the entire Coachella Valley, the Rancho Mirage City Council adopted the enclosed Resolution supporting the Authority's Conceptual Plan for Multi-Purpose Project. The City Council also authorized $10,000 in financial support, which will be sent shortly, to conduct community outreach efforts regarding the need to restore the Sea.

Regards,

Elena Keeran

Elena Keeran
City Clerk

EK/nw

enclosure

cc: Patrick Pratt, City Manager

ADMINISTRATION Tel. (760) 324-4511 Fax. (760) 324-8630
COMMUNITY DEVELOPMENT Tel. (760) 328-2266 Fax. (760) 324-9851
FINANCE Tel. (760) 770-3207 Fax. (760) 324-0526
HOUSING AUTHORITY Tel. (760) 770-3219 Fax. (760) 770-3251
PUBLIC LIBRARY Tel. (760) 341-7323 Fax. (760) 341-5213
PUBLIC WORKS Tel. (760) 770-3224 Fax. (760) 770-3261

69-825 HIGHWAY 111 / RANCHO MIRAGE, CA 92270
www.ci.rancho-mirage.ca.us

RESOLUTION NO. 2007-09

A RESOLUTION OF THE CITY OF RANCHO MIRAGE SUPPORTING THE SALTON SEA AUTHORITY PLAN FOR MULTI-PURPOSE PROJECT

THE CITY OF RANCHO MIRAGE DOES HEREBY RESOLVE AS FOLLOWS:

WHEREAS, the Salton Sea Authority is a Joint Powers Agency formed under the laws of the State of California by a Joint Powers Agreement dated 1993, and is the regional agency for identifying and implementing corrective measures to preserve the beneficial uses of the Sea; and

WHEREAS, the Salton Sea Authority has conducted extensive research and scientific investigation of the Salton Sea and has studied numerous alternative measures to restore and revitalize the Sea; and

WHEREAS, on June 29, 2006, the Board of Directors of the Salton Sea Authority voted unanimously to adopt the Executive Summary of the Salton Sea Authority Conceptual Plan; and

WHEREAS, The City of Rancho Mirage finds that the Salton Sea Authority Conceptual Plan best meets the needs to provide wildlife habitats, improve water quality, and protect air quality in our region; and

WHEREAS, the Salton Sea Conceptual Plan also creates major recreational and economic development opportunities in the Coachella and Imperial Valleys; and

WHEREAS, the Salton Sea Authority Conceptual Plan best meets the needs of The City of Rancho Mirage, its constituents, and those living and working in the Coachella and Imperial Valleys; and

WHEREAS, the Salton Sea Authority Conceptual Plan is superior to other alternatives that the State of California and the U.S. Department of Interior, Bureau of Reclamation, are considering during their programmatic EIR and alternatives study; and

WHEREAS, prior to the formal adopting or implementation of any restoration plan, the Salton Sea Authority will cause any project to undergo a thorough and environmental analysis pursuant to the California Environmental Quality Act.

NOW, THEREFORE, BE IT RÉSOLVED by the City of Rancho Mirage as follows:

1. The City of Rancho Mirage hereby supports the "Salton Sea Authority Conceptual Plan for Multi-Purpose Project" as the preferred plan for restoration and revitalization of the Salton Sea; and

2. The City of Rancho Mirage encourages the State of California and the Department of Interior to select the Salton Sea Authority Conceptual Plan as their preferred alternative for Salton Sea restoration and revitalization; and

3. The City of Rancho Mirage encourages cities and counties and other entities to join with it in support of the Salton Sea Authority Conceptual Plan.

APPROVED and ADOPTED this 18th day of January 2007.

CITY OF RANCHO MIRAGE

RICHARD W. KITE
MAYOR

ATTEST:

ELENA KEERAN, CMC
CITY CLERK

APPROVED AS TO FORM:

STEVEN B. QUINTANILLA
CITY ATTORNEY

CERTIFICATION

STATE OF CALIFORNIA)
COUNTY OF RIVERSIDE)
CITY OF RANCHO MIRAGE)

I, Elena Keeran, City Clerk of the City of Rancho Mirage, California, do hereby certify that Resolution No. 2007-09 was duly adopted by the City Council of the City of Rancho Mirage, California, at a regular meeting thereof held on the 18th day of January 2007, by the following vote:

AYES:	KITE, HOBART, SEMAN, MOLLER, MEEPOS
NOES:	NONE
ABSENT:	NONE
ABSTAIN:	NONE

Elena Keeran

Elena Keeran, CMC
City Clerk

All Valley Legislative Coalition

42-464 Rancho Mirage Lane, Rancho Mirage, CA 92270 • Phone: 760.568.9351

4 January 2007

Mr. Rick Daniels, Executive Director
Salton Sea Authority
78-401 Highway 111, Ste. T
La Quinta, CA 92253

Dear Mr. Daniels.

On Thursday, January 4, 2007, the All Valley Legislative Coalition (representing the Chambers of Commerce of Cathedral City, Desert Hot Springs, Indio, La Quinta, Palm Desert, Palm Springs and Rancho Mirage) voted to fully endorse the Revitalization and Restoration Conceptual Plan as adopted by the Salton Sea Authority.

The time is now to move past the study phase to the action phase. The future of the Salton Sea is much too important to the economic vitality of our valley to let another few years pass while yet more studies are undertaken.

The Restoration Conceptual Plan as adopted by the Authority addresses the needs not only of the local citizenry, but those of anyone within southern California or Arizona who would be affected by the detrimental effect of increased dust in our air if the sea is allowed to dry up.

- The Plan as adopted addresses the need to continue the link within the Pacific flyway that supports over 400 species of birds.
- The Plan as adopted addresses the increased salinity issue by reducing the size of the water mass, treating the water, and developing a safe way to dry up a portion of the lake bed.
- The Plan as adopted enhances habitat for fish and bird populations.
- The Plan as adopted provides water for recreational use – thereby enhancing the economic viability of the area.

The Plan best meets the needs of residents of the entire Coachella Valley, to provide wildlife habitats, improve water quality, and protect air quality. It will revitalize the Sea as a local economic development engine.

For these reasons, the All Valley Legislative Coalition supports the Revitalization and Restoration Conceptual Plan as adopted by the Salton Sea Authority.

Very truly yours,

Darren D. Zetena
Chairman

Rancho Mirage
Chamber of Commerce

All Valley Legislative Coalition

42-464 Rancho Mirage Lane, Rancho Mirage, CA 92270 • Phone: 760.568.9351

4 January 2007

RESOLUTION

A RESOLUTION OF THE ALL VALLEY LEGISLATIVE COALITION (REPRESENTING THE CHAMBERS OF COMMERCE OF CATHEDRAL CITY, DESERT HOT SPRINGS, INDIO, LA QUINTA, PALM DESERT, PALM SPRINGS AND RANCVHO MIRAGE) SUPPORTING THE SALTON SEA AUTHORITY PLAN FOR MULTI-PURPOSE PROJECT

THE ALL VALLEY LEGISLATIVE COALITION DOES HEREBY RESOLVE AS FOLLOWS:

WHEREAS, the Salton Sea Authority is a Joint Powers Agency formed under the laws of the State of California by a Joint Powers Agreement dated 1993, and is the regional agency for identifying and implementing corrective measures to preserve the beneficial uses of the Sea; and

WHEREAS, the Salton Sea Authority has conducted extensive research and scientific investigation of the Salton Sea and has studied numerous alternative measures to restore and revitalize the Sea; and

WHEREAS, on June 29, 2006, the Board of Directors of the Salton Sea Authority voted unanimously to adopt the Executive Summary of the Salton Sea Authority Conceptual Plan; and

WHEREAS, the All Valley Legislative Coalition finds that the Salton Sea Authority Conceptual Plan best meets the needs

Rancho Mirage Chamber of Commerce

to provide wildlife habitats, improve water quality, and protect air quality in our region; and

WHEREAS, the Salton Sea Conceptual Plan also creates major recreational and economic development opportunities in the Coachella and Imperial Valleys; and

WHEREAS, the Salton Sea Authority Conceptual Plan best meets the needs of the All Valley Legislative Coalition, its constituents, and those living and working in the Coachella and Imperial Valleys; and

WHEREAS, the Salton Sea Authority Conceptual Plan is superior to other alternatives that the State of California and the U.S Department of Interior, Bureau of Reclamation, are considering during their programmatic EIR and alternatives study; and

WHEREAS, prior to the formal adopting or implementation of any restoration plan, the Salton Sea Authority will cause any project to undergo a thorough and environmental analysis pursuant to the California Environmental Quality Act.

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the All Valley Legislative Coalition as follows:

1. The All Valley Legislative Coalition hereby supports the "Salton Sea Authority Conceptual Plan for Multi-Purpose Project" as the preferred plan for restoration and revitalization of the Salton Sea; and
2. The All Valley Legislative Coalition encourages the State of California and the Department of Interior to select the Salton Sea Authority Conceptual Plan as their preferred alternative for Salton Sea restoration and revitalization; and

3. The All Valley Legislative Coalition encourages cities and counties and other entities to join with it in support of the Salton Sea Authority Conceptual Plan.

PASSED, APPROVED, AND ADOPTED by the

All Valley Legislative Coalition this 4th day of January, 2007.

Darren D. Zetena, Chairman

Purpose of Briefing

- Differences in alternatives, designs, and costs
- Reclamation design requirements
  - Reclamation design process
- Description of Alternatives
- Comparisons to California DWR alternatives
- Comparison of Reclamation and DWR Costs
- Overview of risks and uncertainties
- Considerations for the future
- Schedule

RECLAMATION

Differences in Alternatives, Designs and Costs

- Reclamation's alternative descriptions, designs and costs differ from others
  - California Department of Water Resources
  - Salton Sea Authority
  - Imperial Group
- Reclamation design criteria and guidelines were applied
  - Reclamation costs may be higher
  - Others may have different methods and assumptions:
    - Dealing with risks and uncertainties
    - Interpretation of existing information
  - Reclamation makes no judgments on other's designs and costs

RECLAMATION

Reclamation Design Requirements

- Resist and control
  - Embankment seepage
  - Foundation seepage
  - Internal erosion
  - Static settlements
  - Large fault offsets
  - Slope instability and deformations due to major earthquakes and flooding
- Constructible using proven and safe methods

RECLAMATION

Reclamation Embankment Design Process

- Most comprehensive Salton Sea design process to date
  - By Reclamation and Contractor
    - Formulation and Screening of Embankment Options
    - Consideration of Construction Material Sources
    - Consideration of Site Conditions and Available Information
    - Seepage and Stability Evaluations
    - Modeling of Embankments Under Earthquake Loadings
    - Embankment Design Optimization
    - Risk Analysis
    - Rigorous Appraisal Level Cost Estimates

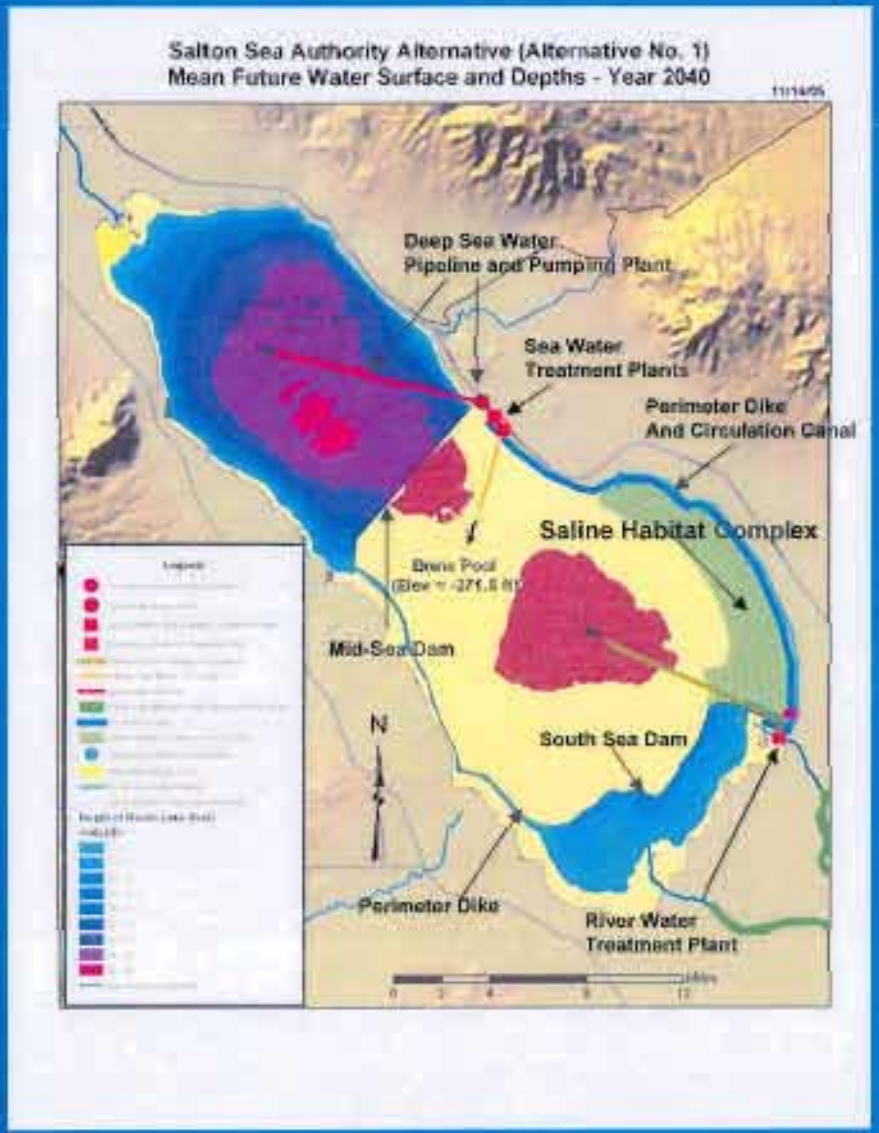
RECLAMATION

Reclamation Restoration Alternatives

- Derived over the last 7 years
  - Alt 1: Mid-Sea Dam with North Marine Lake (Salton Sea Authority alternative)
  - Alt 2: Mid-Sea Barrier (semi-permeable) with South Marine Lake
  - Alt 3: Concentric Lakes (Imperial Group Alternative)
  - Alt 4: North-Sea Dam with Marine Lake
  - Alt 5: Habitat Enhancement without Marine Lake
  - Alt 6: No-Project
- DWR has similar concepts and are compared as follows

RECLAMATION

Alt 1: Mid-Sea Dam with North Marine Lake (Salton Sea Authority Alternative)



Alternatives shown in year 2040 at mean possible future inflow conditions

Note: Reclamation studied a new SSA Alternative:
- **Dam further north**
- **Deeper water**
- **Longer embankments**
- **IID reservoir not considered**
- **Consistent AQM methods applied**
- **Considered dredging requirements**

DWR Alt 7

RECLAMATION

Alt 1: Feature and Cost Comparisons

Description	Reclamation Alternative #1 (New SSA Alt.)[2]	Reclamation's Analysis of DWR Alt #7 (Original SSA Alt.)	DWR Alternative #7 (Original SSA Alt.)
Physical Characteristics:			
Marine lake surface area	98,900 acres	114,000 acres	104,000 acres
Marine lake maximum depth	43.5 feet	48.5 feet	(Not Reported)
Saline habitat complex surface area	16,000 acres	12,000 acres	12,000 acres
Brine pool surface area	17,600 acres	13,000 acres	15,000 acres
Exposed playa surface area	103,800 acres	99,000 acres	97,000 acres
Costs:			
Construction costs (before add-ons)[1]	$5.6 Billion	$3.3 Billion	$3.4 Billion
Implementation costs (after add-ons)[1]	$9.2 Billion	$5.5 Billion	$5.2 Billion
Annual operations, maintenance, and energy costs[1]	$148 Million	$53 Million	$82 Million
Annual operations, maintenance, energy, replacement, and risk costs[1]	$240 Million	Not Estimated	(Not Reported)

1/ Reclamation Costs are appraisal level.
DWR presents their costs as "planning level" showing "general magnitudes".
Included are restoration and air quality mitigation costs.

2/ Reclamation studied a New SSA alternative. DWR studied the original.
Reclamation applied uniform AQM methods for alternatives.
DWR assumed SSA AQM proposal would apply.

RECLAMATION

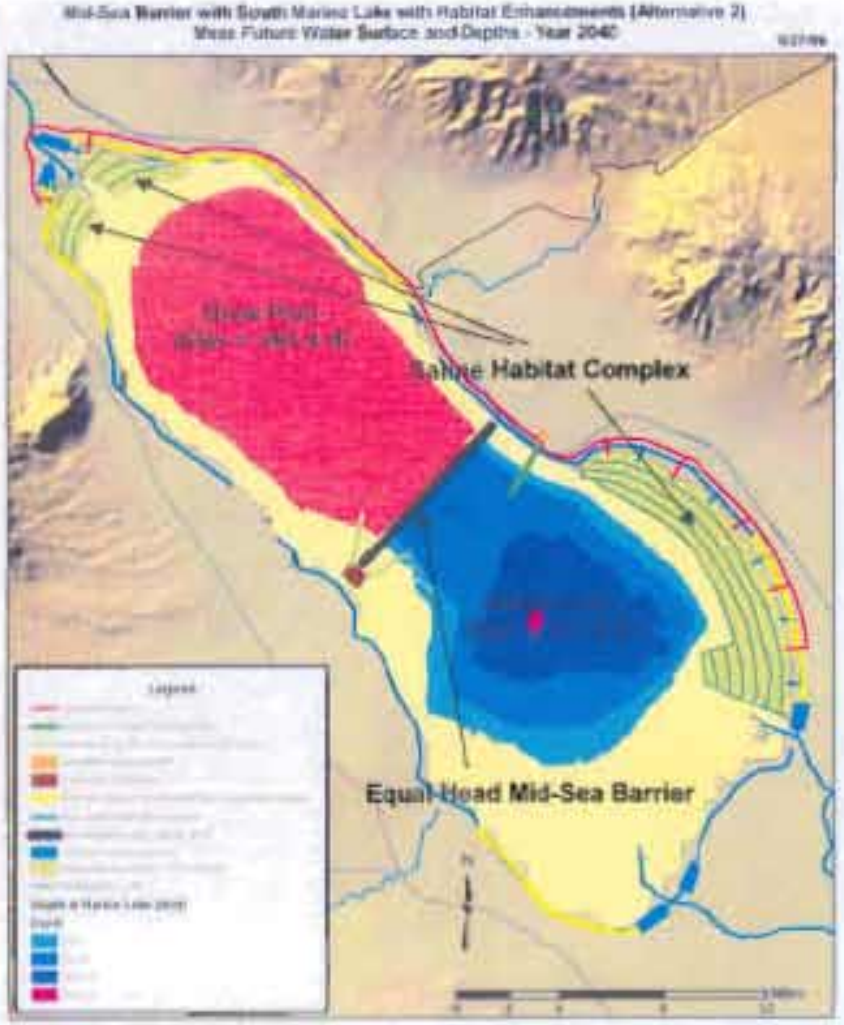
Differences in Cost Estimate Add-ons

- Reclamation [1]
  - 10% Unlisted Items
  - 25% Contingencies
  - 20% Non-contract costs
- California DWR
  - 5% Unlisted Items
  - 30% Contingencies
  - 12% Eng/Legal/Admin

1/ Mobilization costs were incorporated into Reclamation's construction costs (5 percent). The method for inclusion of mobilization costs by DWR is unknown.

RECLAMATION

Alt 2: Mid-Sea Barrier with South Marine Lake



Alternatives shown in year 2040 at mean possible future inflow conditions

Reclamation's Alt 2 uses an equal head barrier. DWR's Alt. 8 uses a dam around most of the Sea.

DWR Alternative 8

RECLAMATION

Alt 2: Feature and Cost Comparisons

Description	Reclamation Alternative #2	DWR Alternative #8
Physical Characteristics:		
Marine lake surface area	59,700 acres	83,000 acres
Marine lake maximum depth	15.5 feet	(Not Reported)
Saline habitat complex surface area	21,700 acres	18,000 acres
Brine pool surface area	66,000 acres	9,000 acres
Exposed playa surface area	73,600 acres	128,000 acres
Costs:		
Construction costs (before add-ons)[1] [2]	$2.1 Billion	$3.8 Billion
Implementation costs (after add-ons)[1] [2]	$3.5 Billion	$5.8 Billion
Annual operations, maintenance, and energy costs[1] [2]	$ 71 Million	$145 Million
Annual operations, maintenance, energy, replacement, and risk costs[1] [2]	$136 Million	(Not Reported)

1/ Reclamation Costs are appraisal level.
DWR presents their costs as "planning level" showing "general magnitudes".
Included are restoration and air quality mitigation costs.

2/ Reclamation's Alt 2 uses an equal head barrier. DWR's Alt. uses a dam around most of the Sea.

RECLAMATION

Alt 3: Concentric Lakes (Imperial Group Alternative)

Alternatives shown in year 2040 at mean possible future inflow conditions

DWR Alt. 4

DWR Alt. 3

Reclamation has determined that only 3 lakes are likely to be required

RECLAMATION

Alt 3: Feature and Cost Comparisons

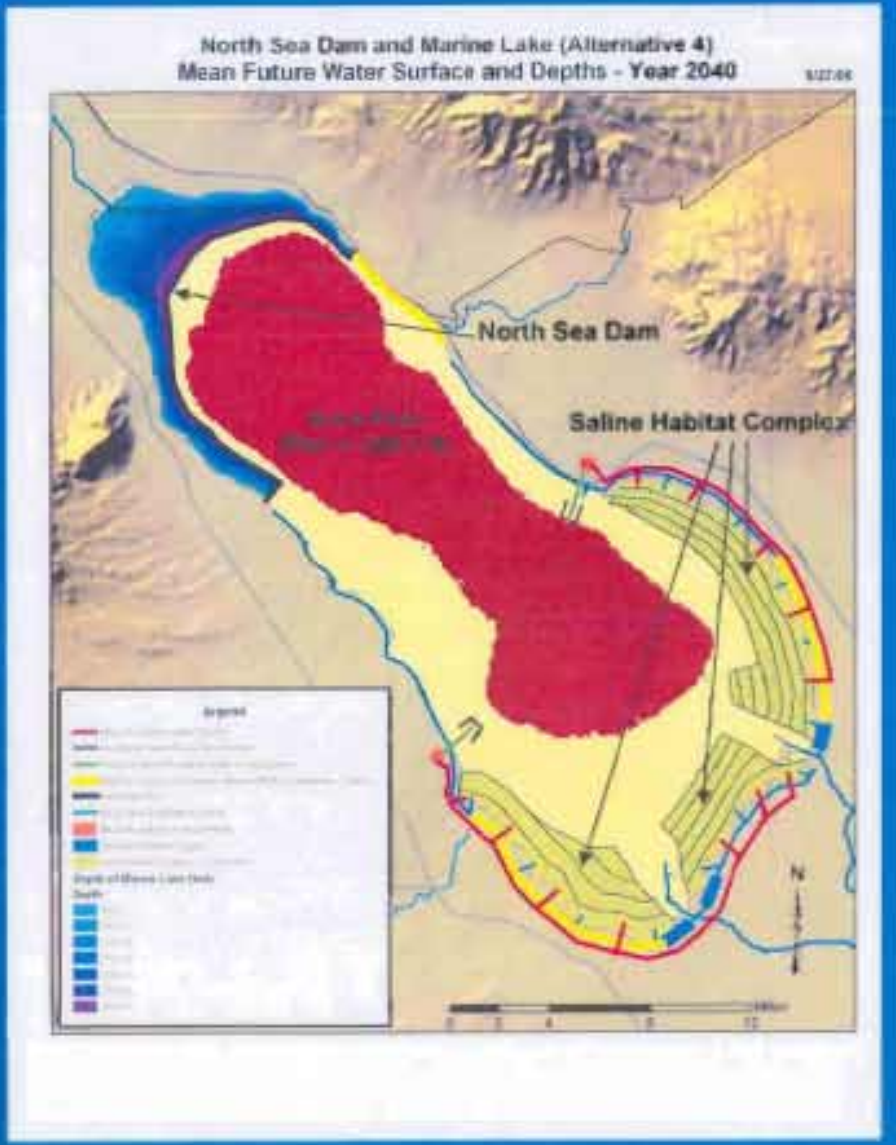
Description	Reclamation Alternative #3 (w/Stone Columns and 3 Lakes) [2]	Reclamation Alternative #3 (w/Geotubes and 3 lakes) [2]	DWR Alternative #4 (w/Geotubes and 4 lakes)
Physical Description:			
Marine lake surface area	47,600 acres	47,600 acres	88,000 acres
Marine lake maximum depth	6 feet	6 feet	6 feet
Saline habitat complex surface area	0 acres	0 acres	0 acres
Brine pool surface area	127,800 acres	127,800 acres	22,000 acres
Exposed playa surface area	65,000 acres	65,000 acres	111,000 acres
Costs:			
Construction costs (before add-ons)[1]	$8.5 Billion	$2.7 Billion	$1.5 Billion
Implementation costs (after add-ons)[1]	$14.0 Billion	$4.4 Billion	$2.3 Billion
Annual operations, maintenance, and energy costs[1]	$ 64 Million	$ 66 Million	$20 Million
Annual operations, maintenance, energy, replacement, and risk costs[1]	$120 Million	$134 Million	(Not Reported)

1/ Reclamation Costs are appraisal level.
DWR presents their costs as "planning level" showing "general magnitudes".
Included are restoration and air quality mitigation costs.

2/ Reclamation has determined that Only 3 lakes are Likely to be required

RECLAMATION

Alt 4: North-Sea Dam with Marine Lake



Alternatives shown in year 2040 at mean possible future inflow conditions

DWR Alt. 5

DWR Alt. 6

RECLAMATION

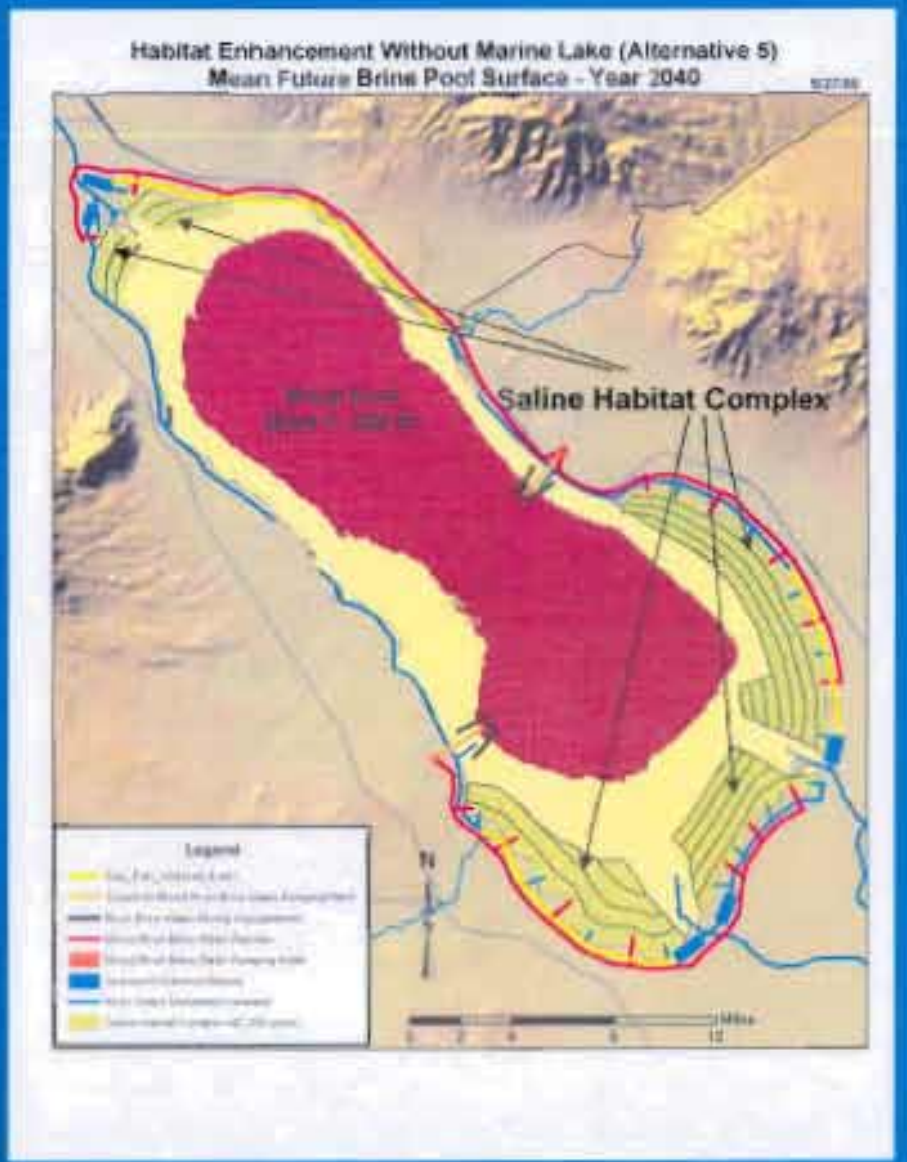
Alt 4: Feature and Costs Comparisons

Description	Reclamation Alternative #4	DWR Alternative #5
Physical Description:		
Marine lake surface area	19,500 acres	62,000 acres
Marine lake maximum depth	33 feet	(Not Reported)
Saline habitat complex surface area	37,200 acres	45,500 acres
Brine pool surface area	91,300 acres	13,000 acres
Exposed playa surface area	91,800 acres	117,000 acres
Costs:		
Construction costs (before add-ons)[1]	$6.6 Billion	$3.0 Billion
Implementation costs (after add-ons)[1]	$10.9 Billion	$4.5 billion
Annual operations, maintenance, and energy costs[1]	$ 89 million	$133 million
Annual operations, maintenance, energy, replacement, and risk costs[1]	$172 million	(Not Reported)

1/ Reclamation Costs are appraisal level.
DWR presents their costs as "planning level" showing "general magnitudes".
Included are restoration and air quality mitigation costs.

RECLAMATION

Alt 5: Habitat Enhancement without Marine Lake



Alternatives shown in year 2040 at mean possible future inflow conditions

DWR Alt. 1

DWR Alt. 2

RECLAMATION

Alt 5: Feature and Cost Comparisons

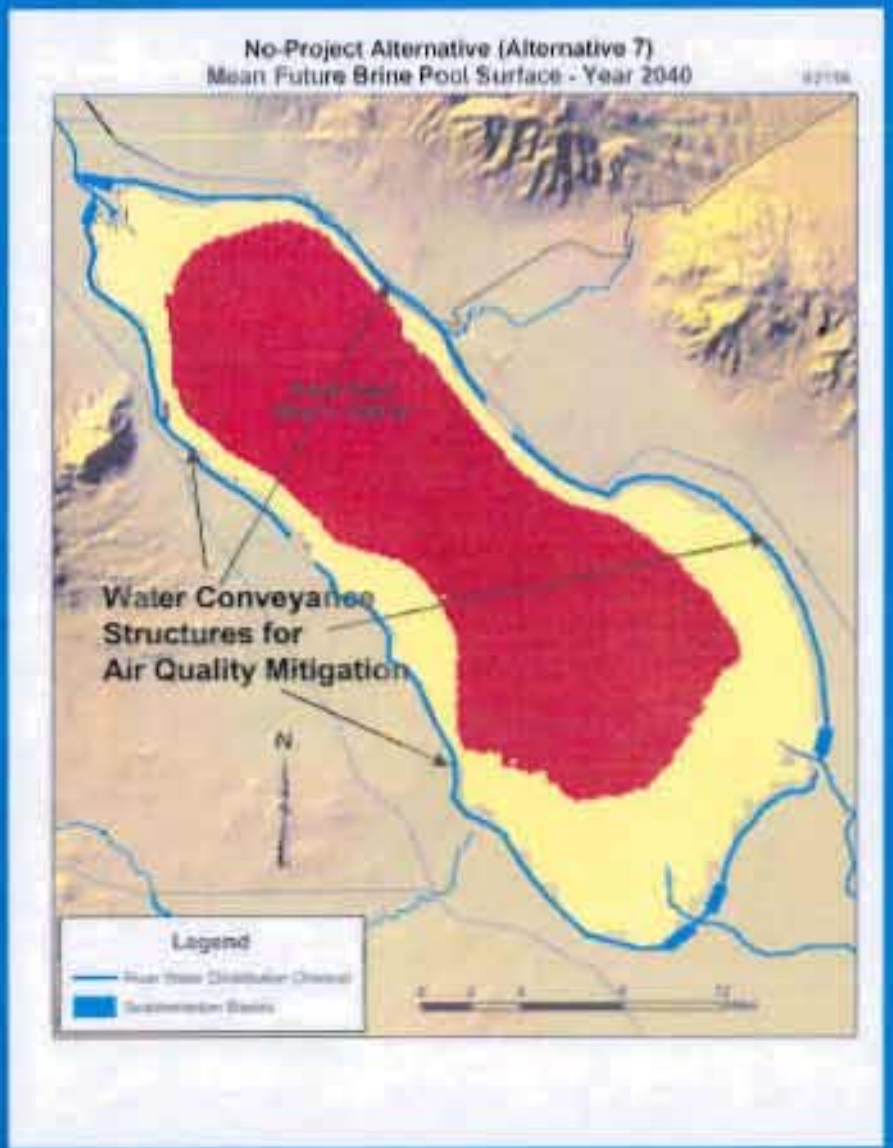
Description	Reclamation Alternative #5	DWR Alternative #2
Physical Description:		
Marine lake surface area	0 acres	0 acres
Marine lake maximum depth	---	---
Saline habitat complex surface area	42,200 acres	75,000 acres
Brine pool surface area	117,400 acres	85,000 acres
Exposed playa surface area	81,200 acres	91,000 acres
Costs:		
Construction costs (before add-ons)[1] [2]	$2.2 Billion	$2.2 Billion
Implementation costs (after add-ons)[1] [2]	$3.6 Billion	$3.3 Billion
Annual operations, maintenance, and energy costs[1] [2]	$ 79 Million	$108 million
Annual operations, maintenance, energy, replacement, and risk costs[1] [2]	$154 Million	(Not Reported)

1/ Reclamation Costs are appraisal level.
DWR presents their costs as "planning level" showing "general magnitudes".
Included are restoration and air quality mitigation costs.

2/ Reclamation assumes the need for 50 percent more embankments in the design of Saline habitat complex.

RECLAMATION

Alt 6: No-Project



Note: DWR only included air quality management for areas provided for in the QSA (Between -235 -248 ft)

Alternatives shown in year 2040 at mean possible future inflow conditions

DWR No-Action (Variability)

RECLAMATION

Alt 6: Feature and Cost Comparisons

Description	Reclamation Alternative #6	DWR No-Action (Variability)
Physical Description:		
Marine lake surface area	0 acres	0 acres
Marine lake maximum depth	---	---
Saline habitat complex surface area	0 acres	0 acres
Brine pool surface area	138,400 acres	140,000 acres
Exposed playa surface area	92,200 acres	81,000 acres
Costs:		
Construction costs (before add-ons)[1] [2]	$0.9 Billion	$0.5 Billion
Implementation costs (after add-ons)[1] [2]	$1.4 Billion	$0.8 Billion
Annual operations, maintenance, and energy costs[1]	$ 87 Million	$48 Million
Annual operations, maintenance, energy, and replacement costs[1] [2]	$164 Million	(Not Reported)

1/ Reclamation Costs are appraisal level.
DWR presents their costs as "planning level" showing "general magnitudes".
Included are restoration and air quality mitigation costs.

2/ DWR only included air quality management for areas provided for in the QSA (between -235 and -248 ft).

RECLAMATION

Risks and Uncertainties

- All alternatives have serious to high risks:
  - Uncertainty of Future Inflows
  - Selenium Exposure to Breeding Birds
  - Hydrodynamic / Stratification Impacts
  - Eutrophication
  - Fishery Sustainability

RECLAMATION

Considerations for the Future

- All alternatives have substantial risks and uncertainties
- All alternatives are very expensive
- Negative impacts of doing nothing are serious
- Consideration could be given to:
  - Developing, studying, and monitoring relatively small parcels of Saline Habitat Complexes
    - Develop adaptive and flexible strategies to reduce risks and uncertainties
    - Study habitat values
    - Expand complexes based on lessons learned
      - Construct in phases
        - » Progressive habitat development

RECLAMATION

Schedule

- End of January 2007 - Release of Summary Report
- April 2007 – Final Reports to Congress

RECLAMATION